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General Catalogue, 1925-26



CORVALLIS, OREGON

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NUMBERING OF COURSES

Courses are designated by numbers of three digits in which the left-hand digit represents usually the year (as first, second, third, etc.) in which the course is normally pursued; the middle digit represents the group of related courses in the department to which the course belongs; and the right-hand digit represents the sequence of courses in cases where courses normally follow each other in succeeding terms.

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General Catalogue

1925-26

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CORVALLIS, OREGON

O. A. C. PRESS

1925

OREGON AGRICULTURAL COLLEGE

The work of the Oregon Agricultural College is organized into three main divisions: Resident Instruction, Experiment Station, and Extension Service.

I.—THE RESIDENT INSTRUCTION DIVISION includes

The School of Agriculture (B.S., M.S. Degrees)

With departments of Agricultural Engineering, Animal Husbandry, Dairy Husbandry, Farm Crops, Farm Management, Horticulture (including Pomology, Vegetable Gardening, Landscape Gardening, Floriculture, and Horticultural Products), Poultry Husbandry, Soils, and Veterinary Medicine.

The School of Basic Arts and Sciences

With departments of Art and Rural Architecture, Bacteriology, Botany and Plant Pathology, Chemistry, English Language and Literature, Entomology, History, Mathematics, Modern Languages, Physics, Public Speaking and Dramatics, and Zoology and Physiology.

The School of Commerce (B.S. Degree)

With departments of Economics and Sociology, Finance and Administration, Political Science, and Secretarial Training.

The School of Engineering and Mechanic Arts (B.S., C.E., E.E., M.E. Degrees)

With departments of Civil Engineering, Electrical Engineering, Highway Engineering, Hydraulics and Irrigation Engineering, Industrial Arts, Mechanics and Materials, and Mechanical Engineering.

The School of Forestry (B.S., M.S. Degrees)

With departments of General Forestry and Logging Engineering.

The School of Home Economics (B.S., M.S. Degrees)

With departments of Home Economics Education, Household Administration, Household Art, Household Science, and Institutional Management.

The School of Mines (B.S. Degree)

With departments of Geology, Metallurgy, and Mining Engineering.

The School of Pharmacy (B.S., Ph.C. Degrees)

The School of Vocational Education (B.S., M.S. Degrees)

With departments of Agricultural Education, Commercial Education, Education, Home Economics Education, Industrial Education, and Psychology.

The Department of Chemical Engineering (B.S. Degree)

The Department of Military Science and Tactics (B.S. Degree)

Including Reserve Officers Training Corps in Infantry, Field Artillery, Engineers, and Cavalry.

The General Departments

Industrial Journalism, Library Practice, Physical Education for Men, and Physical Education for Women.

The School of Music (Music Diploma)

With departments of Theory, Piano, Organ, Singing, Violin, and Band Instruments.

The Short Sessions

Including the Summer Session and Winter Short Courses.

II.—THE EXPERIMENT STATION DIVISION includes

The Home Station, at Corvallis

The Branch Stations, at Union, Moro, Hermiston, Talent, Burns, Astoria and Hood River.

III.—THE EXTENSION SERVICE DIVISION includes

County Agricultural, Home Demonstration, and Boys' and Girls' Club Work

Extension Specialist Work

Extension Publications, Lectures, Meetings, Correspondence.

CONTENTS

	Pages
College Calendar	5-6
Map of the Campus	7
Board of Regents	8
Administrative Offices	8
Officers of Administration and Instruction	9-32
General Information	33-77
Admission to the College	33-36
Rules and Regulations	36-38
Degrees and Certificates	38-39
Student Expenses	40-45
Loan Funds	45-47
Prizes	48-49
Health Service	49
History and Organization	50-55
Grounds and Buildings	55-67
Income of the College	67-70
Official Publications, Student Publications	70-72
Student Organizations	72-77
School of Agriculture	78-135
School of Basic Arts and Sciences	136-189
School of Commerce	190-228
School of Engineering and Mechanic Arts	229-265
School of Forestry	266-278
School of Home Economics	279-296
School of Mines	297-309
School of Pharmacy	310-323
School of Vocational Education	324-341
Chemical Engineering*	342-345
Industrial Journalism	346-348
Library	349-351
Military Science and Tactics	352-363
Physical Education for Men	364-369
Physical Education for Women	370-376
School of Music	377-391
Summer Session	392-425
Short Courses and Conferences	426
Experiment Station	427-433
Extension Service	434-435
O. A. C. Alumni Association	436-438
Statistics of Enrollment	439
Index of Names	440-442
Index	443-448

1925	JUNE	JULY
	S M T W T F S	S M T W T F S
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AUGUST	SEPTEMBER	OCTOBER
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NOVEMBER	DECEMBER	1925 Summer Session June 22 to July 31 First Term Regis- tration September 21 - 26
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1926	JANUARY	FEBRUARY
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MARCH	APRIL	MAY
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JUNE	JULY	Second Term Registration January 4 Third Term Registration March 29
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COLLEGE CALENDAR, 1925-26

1925

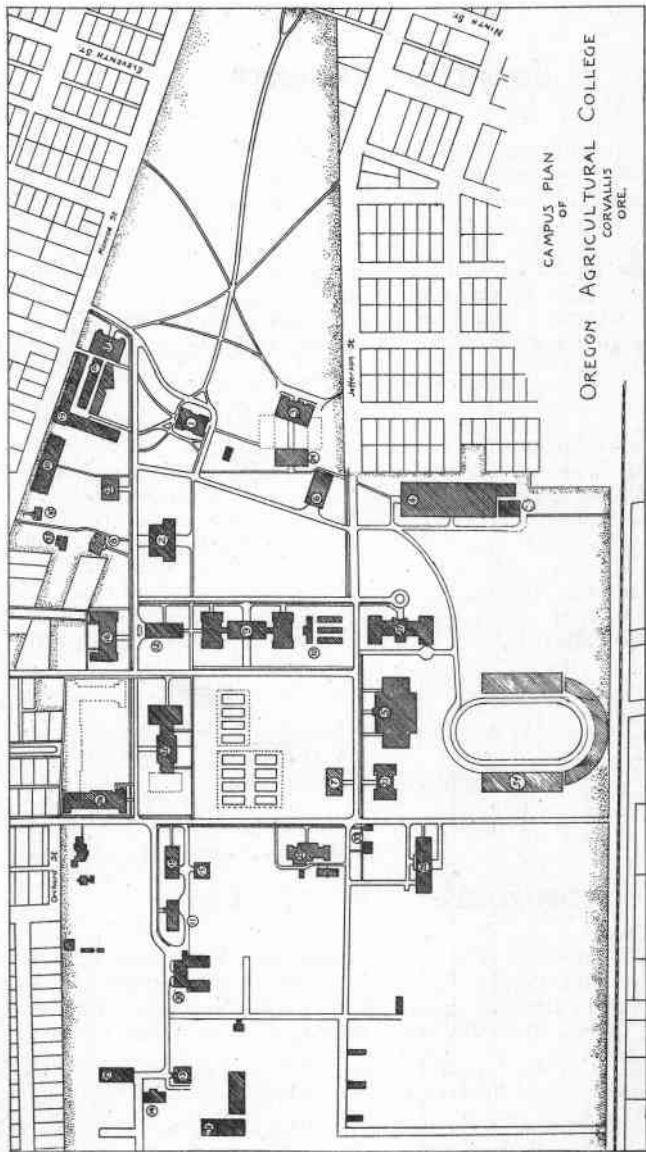
June 22, <i>Monday</i>	Summer Session begins
July 4, <i>Saturday</i>	Independence Day; holiday
July 31, <i>Friday</i>	Summer Session ends
September 21-24, <i>Monday to Thursday</i>	Freshman Week, Required English Examination
September 24, <i>Thursday</i>	Entrance Examinations
September 25, <i>Friday</i>	Final Registration for Freshmen
September 26, <i>Saturday</i>	Final Registration for all other students
September 28, <i>Monday</i>	Recitations begin
October 2, <i>Friday</i>	Meeting of Board of Regents
October 9, <i>Friday</i>	Latest day for filing change slips without fee
October 9, <i>Friday</i>	Latest day for rebates in full
October 17, <i>Saturday</i>	Latest day for dropping of courses without "F"
October 17, <i>Saturday</i>	Latest day for addition of new courses or new registrations
October 30, <i>Friday</i>	Latest day for changes in advanced standing reports
October 30, <i>Friday</i>	Latest day for removal of incompletes
October 30, 31, <i>Friday, Saturday</i>	Examinations for Advanced Standing
November 6, <i>Friday</i>	Latest day for rebate of one-half fees
November 10, <i>Tuesday</i>	Close of mid-term examinations
November 11, <i>Wednesday</i>	Armistice Day; holiday
November 14, <i>Saturday</i>	Latest day for seniors to file applications for graduation
November 26, 27, 28, <i>Thursday, Friday Saturday</i>	Thanksgiving vacation
December 11, <i>Friday</i>	Recitations end
December 14-18, <i>Monday to Friday</i>	Final examinations
December 18, <i>Friday</i>	Christmas vacation begins

1926

January 2, <i>Saturday</i>	Entrance Examinations
January 4, <i>Monday</i>	Second term registration
January 5, <i>Tuesday</i>	Recitations begin
January 6, <i>Wednesday</i>	Meeting of Board of Regents
January 15, <i>Friday</i>	Latest day for filing change slips without fee
January 15, <i>Friday</i>	Latest day for rebates in full
January 23, <i>Saturday</i>	Latest day for dropping of courses without "F"

COLLEGE CALENDAR (Continued)

January 23, <i>Saturday</i>	Latest day for addition of new courses or new registrations
February 5, <i>Friday</i>	Latest day for removal of incompletes
February 5, 6, <i>Friday, Saturday</i>	Examinations for Advanced Standing
February 10, <i>Wednesday</i>	Close of mid-term examinations
February 12, <i>Friday</i>	Latest day for changes in advanced standing reports
February 12, <i>Friday</i>	Latest day for rebate of one-half fees
February 22, <i>Monday</i>	Washington's Birthday; holiday
March 19, <i>Friday</i>	Recitations end
March 20-25, <i>Saturday to Thursday</i>	Final examinations
March 25, <i>Thursday</i>	Second term ends
March 27, <i>Saturday</i>	Entrance examinations
March 29, <i>Monday</i>	Third term registration
March 30, <i>Tuesday</i>	Recitations begin
April 9, <i>Friday</i>	Latest day for filing change slips without fee
April 9, <i>Friday</i>	Latest day for rebates in full
April 17, <i>Saturday</i>	Latest day for dropping of courses without "F"
April 17, <i>Saturday</i>	Latest day for addition of new courses or new registrations
April 30, <i>Friday</i>	Latest day for removal of incompletes
April 30, 31, <i>Friday, Saturday</i>	Examinations for Advanced Standing
May 5, <i>Wednesday</i>	Close of mid-term examinations
May 7, <i>Friday</i>	Latest day for rebate of one-half fees
May 7, <i>Friday</i>	Latest day for changes in advanced standing reports
May 15, <i>Saturday</i>	Latest day for seniors to adjust graduation deficiencies
May 31, <i>Monday</i>	Decoration Day; holiday
June 3, <i>Thursday</i>	Senior examinations close
June 4, <i>Friday</i>	Recitations end
June 5, <i>Saturday</i>	Senior Class Day; Alumni Reunion
June 6, <i>Sunday</i>	Baccalaureate Sermon
June 7, <i>Monday</i>	Fifty-seventh Annual Commencement; Meeting of Board of Regents
June 7-11, <i>Monday to Friday</i>	Final examinations
June 11, <i>Friday</i>	Third term ends
June 21, <i>Monday</i>	Summer session begins
July 5, <i>Monday</i>	Independence Day; holiday
July 30, <i>Friday</i>	Summer session ends



1. Administration.
2. Library.
3. Science.
4. Armory.
5. Men's Gymnasium.
6. Women's Gymnasium.
7. Y Hut.
8. Shepard.
9. Agriculture.
10. Greenhouses.
11. Horticultural Products.
12. Dairy.
13. Veterinary.
14. Stock Judging.
15. Farm Mechanics.
16. Commerce.
17. Apperson.
18. Engineering Laboratory.
19. Mechanic Arts.
20. Foundry.
21. Forestry.
22. Home Economics.
23. Mines.
24. Pharmacy.
25. Cauthorn.
26. Margaret Snell.
27. Waldo.
28. Men's Dormitory.
- 29 - 31. Barns.
33. President's Residence.
34. Stadium.

BOARD OF REGENTS

Officers

HON. J. K. WEATHERFORD, President.....	Albany
HON. E. E. WILSON, Secretary.....	Corvallis
HON. B. F. IRVINE, Treasurer.....	Portland

Ex-officio Members

HON. WALTER M. PIERCE, Governor.....	Salem
HON. SAM A. KOZER, Secretary of State.....	Salem
HON. J. A. CHURCHILL, Superintendent of Public Instruction.....	Salem
HON. GEORGE A. PALMITER, Master of State Grange.....	Hood River

Appointed by the Governor

	Term expires
HON. J. K. WEATHERFORD.....	Albany, 1927
HON. SAM H. BROWN.....	Gervais, 1927
HON. MRS. W. S. KINNEY.....	Astoria, 1927
HON. HARRY BAILEY.....	Lakeview, 1929
HON. GEO. M. CORNWALL.....	Portland, 1929
HON. E. E. WILSON.....	Corvallis, 1929
HON. B. F. IRVINE.....	Portland, 1933
HON. E. B. ALDRICH.....	Pendleton, 1933
HON. JEFFERSON MYERS.....	Portland, 1933

Standing Committees

FINANCE.....	Regents Myers, Bailey
EXECUTIVE.....	Regents Weatherford (Chairman), Aldrich, Pierce, Myers
COLLEGE.....	Regents Churchill (Chairman), Kozer, Aldrich
STATION.....	Regents Pierce (Chairman), Cornwall, Bailey
FORESTRY.....	Regents Cornwall (Chairman), Bailey, Palmiter
EXTENSION.....	Regents Myers (Chairman), Palmiter, Bailey
BUILDING.....	Regent Weatherford (Chairman)

ADMINISTRATIVE OFFICES

EXECUTIVE OFFICE—

WILLIAM JASPER KERR, D.Sc., LL.D., President.....	101 Commerce Hall
WILLIAM ARTHUR JENSEN, Executive Secretary.....	101 Commerce Hall
REGISTRAR—ERWIN BERTRAN LEMON, B.S.....	7 Administration Building
BUSINESS MANAGER—EDWIN MONROE SMITH, B.S.D.....	Adm. Building
DEAN OF MEN—ULYSSES GRANT DUBACH, Ph.D.....	111 Commerce Hall
DEAN OF WOMEN—KATE WETZEL JAMESON, Ph.D.....	105 Library

OFFICERS OF ADMINISTRATION AND INSTRUCTION*

ADMINISTRATIVE COUNCIL

WILLIAM JASPER KERR, D.Sc., LL.D.....	President
ARTHUR BURTON CORDLEY, D.Sc.....	Dean of the School of Agriculture
JOHN ANDREW BEXELL, M.A.....	Dean of the School of Commerce; Professor of Commercial Education.
GRANT ADELBERT COVELL, M.E.....	Dean of the School of Engineering and Mechanic Arts.
GEORGE WILCOX PEAVY, M.S.F.....	Dean of the School of Forestry
AVA BERTHA MILAM, Ph.B., A.M.....	Dean of the School of Home Economics.
EDWIN DEVORE RESSLER, A.M.....	Dean of the School of Vocational Education; Professor of Education.
ADOLPH ZIEFLE, Ph.C., M.S.....	Dean of the School of Pharmacy
CHARLES EDWARD NEWTON, E.M.....	Dean of the School of Mines
M. ELLWOOD SMITH, Ph.D.....	Dean of the School of Basic Arts and Sciences; Director of the Summer Session.
PAUL VESTAL MARIS, B.S.....	Director of the Extension Service
JAMES TERTIUS JARDINE, B.S.....	Director of the Experiment Station
GEORGE WILLIAMS MOSES, Colonel, U. S. A.....	Commandant of Cadets; Professor of Military Science and Tactics.
WILLIAM ARTHUR JENSEN.....	Executive Secretary
KATE WETZEL JAMESON, Ph.D.....	Dean of Women
ULYSSES GRANT DUBACH, Ph.D.....	Dean of Men

PROFESSORS

FREDERICK BERCHTOLD, A.M.....	Professor of English Language and Literature. Bern (Switzerland) State Normal School, B. in Ped.; graduate work, National University, A.B., A.M.
JOHN B. HORNER, Litt.D.....	Professor of History; Director of Oregon Historical Research. Philomath College, B.S., M.S., Litt.D.; Blue Mountain University; Willa- mette University, A.B., A.M.; University of California; Harvard University.
JOHN FULTON, M.S.....	Professor of Chemistry; Director of Chemical Laboratories. Edinburgh (Scotland) Normal School; Oregon Agricultural College, B.S., M.S.; Harvard University, S.M.

*The arrangement within the respective groups is by seniority of appointment to present rank. An index of names in this general roster will be found on page 440.

- CHARLES LESLIE JOHNSON, B.S.....Professor of Mathematics
Oregon Agricultural College, B.S.; Harvard University; University of Chicago.
- HENRY DESBOROUGH SCUDDER, B.S.....Professor of Farm Management;
Chief in Farm Management, Experiment Station.
University of Illinois, B.S.; graduate work, *ibid.*
- GORDON VERNON SKELTON, C.E.....Professor of Highway Engineering
University of Arkansas, B.C.E., C.E.
- LOUIS BACH, A.M.....Professor of Modern Languages
University of Strassburg; University of Switzerland, A.M.
- ERMINE LAWRENCE POTTER, M.S.....Professor of Animal Husbandry;
Animal Husbandman, Experiment Station.
Montana Agricultural College, B.S.; Iowa State College, B.S.A., M.S.
- HECTOR MACPHERSON, Ph.D.....Professor of Economics and Sociology;
Director of the Bureau of Organization and Markets.
Queen's University, B.A.; University of Chicago, S.M., Ph.D.; Halle University; Berlin University.
- ULYSSES GRANT DUBACH, Ph.D.....Professor of Political Science
Emporia (Kansas) Teachers College; Baker University; Indiana University, A.B.; Harvard University, M.A.; University of Wisconsin, Ph.D.
- HENRY CLAY BRANDON, A.M.....Professor of Industrial Arts; Director
of Shops.
Indiana University, A.B., A.M.; Columbia University, A.M.
- RICHARD HAROLD DEARBORN, A.B., B.S.....Professor of Electrical
Engineering.
Willamette University, A.B.; Cornell University, B.S. in E.E.
- BENNETT THOMAS SIMMS, D.V.M.....Professor of Veterinary Medicine;
Veterinarian, Experiment Station.
Alabama Polytechnic Institute, D.V.M.; graduate work, Kansas City Veterinary College, University of Chicago.
- WILLIAM BALLANTYNE ANDERSON, Ph.D.....Professor of Physics
University of Wisconsin, B.S., M.S., Ph.D.
- HOWARD PHILLIPS BARSS, S.M.....Professor of Botany and Plant Pathology;
Plant Pathologist, Experiment Station.
University of Rochester, A.B.; Harvard University, S.M.
- GEORGE ROBERT HYSLOP, B.S.....Professor of Farm Crops; Agronomist,
Experiment Station.
Indiana University; Ohio State University, B.S.; graduate work, *ibid.*, Cornell University.
- PHILIP MARTIN BRANDT, A.M.....Professor of Dairy Husbandry; Dairy
Husbandman, Experiment Station.
University of Missouri, B.S. (in Ag.), A.M.
- WILBUR LOUIS POWERS, M.S.....Professor of Soils; Chief, Department of Soils,
Experiment Station.
University of Illinois; New Mexico Agricultural College, B.S., M.S.; graduate work, University of California.
- ARTHUR LEE PECK, B.A.....Professor of Landscape Gardening and Floriculture;
Superintendent of Campus and Greenhouses.
Massachusetts Agricultural College, B.S.; Boston University, B.A.

- ARTHUR GEORGE BOUQUET, B.S.....Professor of Vegetable Gardening; Horticulturist (Vegetable Gardening), Experiment Station.
Oregon Agricultural College, B.S.; graduate work, Massachusetts Agricultural College.
- WILLIAM JAMES GILMORE, B.S.....Professor of Agricultural Engineering
Iowa State College, B.C.E.; graduate work, *ibid.*, B.S. (in A.E.).
- *ALMA GRACE JOHNSON, B.S.....Professor of Household Administration
Indianapolis Teachers College; Purdue University; Columbia University, B.S.
- FRANCIS LAWRENCE SNOW.....Professor of Industrial Journalism
University of Kansas; Kansas State Agricultural College.
- EDNA AGNES COCKS, A.M.....Professor and Director of Physical Education for Women.
University of Southern California, A.B., A.M.; University of California, Yale University.
- HELEN LEE DAVIS, A.B., B.S.....Vice-Dean of the School of Home Economics; Professor of Household Art.
Vassar College, A.B.; graduate work, Columbia University, B.S.
- EDWARD MARIS HARVEY, Ph.D.....Professor of Research in Horticulture; Horticulturist (Physiology), Experiment Station.
Friends University, A.B.; graduate work, Johns Hopkins University, University of Chicago, Ph.D.
- SHIRLEY JONES, M.S.A.....Professor of Agricultural Chemistry; Chemist, Experiment Station.
University of California, B.S.; graduate work, *ibid.*, Cornell University, M.S.A.
- STUART HOBBS SIMS, B.S.....Professor of Civil Engineering
University of Michigan, B.S. (in C.E.); graduate study, University of Iowa.
- GODFREY VERNON COPSON, M.S.....Professor of Bacteriology; Bacteriologist, Experiment Station.
Michigan Agricultural College, B.S.; Oregon Agricultural College, M.S.; graduate work, Massachusetts Agricultural College, University of Bern (Switzerland), University of Wisconsin, Columbia University.
- HERBERT TOWNSEND VANCE, B.S.....Professor of Secretarial Training; Professor of Advertising and Salesmanship.
Oregon Agricultural College, B.S.
- WALTER SHELDON BROWN, M.S.....Professor of Horticulture; Horticulturist in Charge, Experiment Station.
Alfred University, A.B.; Cornell University, B.S.A.; University of Wisconsin, M.S.
- JESSE FRANKLIN BRUMBAUGH, A.M.....Professor of Psychology
DePauw University, A.B.; South Dakota State Law School, LL.B.; University of Chicago, A.M.
- NEWEL HOWLAND COMISH, M.S...Professor of Economics and Sociology
Brigham Young University; Agricultural College of Utah, B.S.; University of Chicago; University of Wisconsin, M.S.
- DOUGLAS CLERMONT LIVINGSTON, B.S.....Professor of Geology
McGill University, B.S.; Stanford University.

*On leave of absence during 1925-26.

- HEBER HOWARD GIBSON, A.M.....Professor of Agricultural Education
Denison University, A.B.; Columbia University, A.M.; Cornell University.
- WALLACE HOPE MARTIN, M.E.....Professor of Heat Engineering
University of Minnesota, M.E.
- CHARLES BUREN MITCHELL, M.A.....Professor of Public Speaking
DePauw University, A.B.; University of Michigan, M.A.
- HENRY RICHARD PATTERSON, B.S.....Professor of Logging Engineering
University of Oregon, B.S.
- HARRY STANLEY ROGERS, B.S.....Professor of Hydraulics and Irrigation Engineering.
University of Wyoming, B.S. in C.E.; graduate work, State University of Iowa, University of Washington.
- FLOYD ELBA ROWLAND, Ph.D.....Professor of Industrial Chemistry
Oregon Agricultural College, B.S.; University of Illinois, A.B., A.M., Ph.D.
- WILLIBALD WENIGER, Ph.D.....Professor of Physics
University of Wisconsin, B.A., M.A., Ph.D.; graduate work, University of Michigan.
- NATHAN FASTEN, Ph.D.....Professor of Zoology and Physiology
College of the City of New York, B.S.; University of Wisconsin, Ph.D.
- SAMUEL HERMAN GRAF, M.S.....Professor of Mechanics and Materials
Oregon Agricultural College, B.S. (in E.E.), B.S. (in M.E.), E.E., M.E., M.S. (in E.E.).
- LAWRENCE FISHER WOOSTER, B.S.....Professor of Applied Electricity
University of Illinois, BS. (in E.E.).
- *SIBYLLA HADWEN.....Professor of Institutional Management; Director of Women's Dormitories.
Lyceé Fénélon (Lille, France); graduate of St. Luke's Training School for Nurses (San Francisco); Macdonald Institute, Ontario Agricultural College.
- ORAN MILTON NELSON, B.S.....Professor of Animal Husbandry; Animal Husbandman, Experiment Station.
University of Wisconsin, B.S.
- ERNEST HERMAN WIEGAND, B.S. (in Ag.).....Professor of Horticultural Products; Horticulturist (Horticultural Products), Experiment Station.
University of Missouri, B.S. (in Ag.).
- JOHN RANDOLPH DUPRIEST, M.M.E.....Professor of Mechanical Engineering.
Virginia Polytechnic Institute, B.S. in E.E.; Cornell University, M.E., M.M.E.
- ALFRED GUNN LUNN, B.S.....Professor of Poultry Husbandry; Poultry Husbandman in Charge, Experiment Station.
Oregon Agricultural College, B.S.
- CHARLES VLADIS RUZEK, B.S.A.....Professor of Soil Fertility; Associate in Soils (Fertility), Experiment Station.
University of Wisconsin, B.S.A.

*On leave of absence during 1925-26.

- JOHN LEO FAIRBANKS.....Professor of Art
University of Chicago; New York University; Columbia University;
Academie Colorossi, Academie de la Grande Chaumier, Academie Julien, Paris.
- ALFRED SCHMITT, Ph.D.....Professor of Finance and Administration
Knox College, B.A.; graduate work, University of Chicago, University of
Cambridge, University of Leipzig, Ph.D.
- JESSAMINE CHAPMAN WILLIAMS, M.A.....Professor of Household
Science.
Columbia University, B.S.; graduate work, *ibid.*, M.A., Yale University,
Cornell University.
- WILLIAM ALEXANDER KEARNS, B.S.....Director of Physical Education
and Intercollegiate Athletics.
Bellevue College, B.S.; University of Omaha.
- CAPTAIN HARLEY LATSON, B.S.....Professor of Military Science and
Tactics; In Charge of Engineer Unit, Reserve Officers'
Training Corps.
Colorado College; University of California, B.S.; graduate, Engineer
School, Fort Humphreys, Virginia.
- DON CARLOS MOTE, M.S.....Professor of Entomology; Entomologist,
Experiment Station.
University of Michigan; University of Chicago; Ohio State University,
B.S., M.S.
- MAJOR HERBERT RAY ODELL.....Professor of Military Science and Tac-
tics; In Charge of Field Artillery Unit, Reserve Officers'
Training Corps.
Graduate, United States Military Academy.
- THURMAN JAMES STARKER, M.S.F.....Professor of Forestry
Oregon Agricultural College, B.S.; University of Michigan, M.S.F.
- PAUL PETRI.....Director of the School of Music; Professor of Singing
and Conductor of Choruses.
- LILLIAN JEFFREYS PETRI.....Professor of Piano and Musical Theory
- HARRY LYNDEN BEARD, B.S.....Professor of Band Instruments and
Conductor of Band.
Oregon Agricultural College, B.S.; University of California.
- MARGUERITE MACMANUS.....Professor of Stringed Instruments and
Conductor of Orchestras.
- LIEUTENANT-COLONEL GEORGE HUBERT WHITE.....Professor of Military
Science and Tactics; In Charge of Infantry Unit, Reserve
Officers' Training Corps.
Graduate of Staff and Command School, Fort Leavenworth, Kansas.
- MAJOR DONALD A. ROBINSON.....Professor of Military Science and Tac-
tics; In Charge of Cavalry Unit, Reserve Officers' Training Corps.
Graduate, Mounted Service School, Cavalry School, Command and Gen-
eral Staff School, United States Army.
- WINFRED MCKENZIE ATWOOD, Ph.D.....Professor of Plant Physiology
Cornell College, A.B., A.M.; University of Chicago, S.M., Ph.D.
- FLORENCE BLAZIER, M.A.....Professor of Home Economics Education
Bradley Polytechnic Institute; University of Chicago, Ph.B.; University
of Indiana, M.A.

ASSOCIATE PROFESSORS

- IDA BURNETT CALLAHAN, B.S.....Associate Professor of English
Language and Literature.
University of California; University of Chicago; Columbia University;
Oregon Agricultural College, B.S.
- EDWARD BENJAMIN BEATY, A.M.....Associate Professor of Mathematics;
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ington; University of California, A.M.
- JAMES HERVEY BATCHELLER, B.S.....Associate Professor of Mining
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Massachusetts Institute of Technology, B.S.
- SAMUEL MICHAEL PATRICK DOLAN, C.E.....Associate Professor of
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- FREDERICK CHARLES KENT, A.B.....Associate Professor of Mathematics
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Earlham College, B.S.; graduate work, University of Chicago, Woods
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- CHARLES ELMER OWENS, A.M.....Associate Professor of Plant
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work, University of Wisconsin.
- FRANK ABBOTT MAGRUDER, Ph.D.....Associate Professor of Political
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- CHARLES JARVIS MCINTOSH, B.S.....Associate Professor of Industrial
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State College of Washington, B.S.; Iowa State College, M.S.
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- LILA MORRIS O'NEALE, A.B., B.S.....Associate Professor of Household
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Leland Stanford Junior University, A.B.; San Jose State Teachers Col-
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- ELEANOR REED MACLAY, M.S.....Associate Professor of Household
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Hedding College; University of Illinois; Brown's Business College.
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- BESS CHAPPELL, A.M.....State Supervisor and Teacher Trainer in Vocational Home Economics.
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- HOWARD NOTSON COLMAN, A.B., B.S.....Assistant Professor of Dairy Husbandry.
University of Nebraska, A.B., B.S.; University of Minnesota; graduate work, State College of Washington.
- CAPTAIN MARCEL A. GILLIS.....Assistant Professor of Military Science and Tactics; Instructor in Infantry Unit, Reserve Officers' Training Corps.
Graduate Infantry School, United States Army.

- LIEUTENANT ROBERT G. LOVETT.....Assistant Professor of Military Science and Tactics; Instructor in Engineer Unit, Reserve Officers' Training Corps.
Graduate Engineer School, United States Army.
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University of Chicago, Ph.B.; graduate work, Columbia University, University of Southern California, University of Chicago.

INSTRUCTORS AND ASSISTANTS

- AMBROSE ELLIOTT RIDENOUR, B.S.....Instructor in Foundry Practice
Kansas State Agricultural College, B.S.
- CHARLES GEORGE WILTSHIRE..Instructor in Plumbing and Steam Fitting
- KATHARINE BARBARA HAIGHT, R.N.....Instructor in Home Nursing; Preceptress, Margaret Snell Hall.
St. Timothy's Hospital (Philadelphia), R.N.; Columbia University.
- DARWIN GREENE THAYER, B.S.....Instructor in Industrial Arts
Oregon Agricultural College, B.S.; Columbia University.
- MARGARET CHADSEY MOREHOUSE, B.S.....Instructor in Household Art
Oregon Agricultural College, B.S.; graduate work, Columbia University, University of California.
- MARTIN LOUIS GRANNING.....Instructor in Automobile Mechanics
University of Washington; University of California.
- DELOSS EVERETT BULLIS, B.S.....Assistant in Agricultural Chemistry; Assistant Chemist, Experiment Station.
Oregon Agricultural College, B.S.; graduate work, *ibid.*
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Grinnell College; Oregon Agricultural College, B.S.; Columbia University.
- SARA WATT PRENTISS, B.S.....Instructor in Household Administration
University of Washington; Oregon Agricultural College, B.S.; graduate work, Merrill-Palmer School of Home Making.
- CLAIR WILKES, B.S.....Instructor in Farm Management
Oregon Agricultural College, B.S.; graduate work, *ibid.*
- LILLIAN BURNS, B.S.....Instructor in Secretarial Training
Oregon Agricultural College, B.S.; University of California.
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Graduate of Stout Institute; University of California; Oregon Agricultural College.
- ANTON EVERETT JENSEN.....Instructor in Agricultural Engineering
- MARY STANDERWICK VAN KIRK.....Instructor in Household Art
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OFFICERS OF INSTRUCTION

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- GLADYS LOUISE WHIPPLE, B.S.....Instructor in Household Art
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- BENJAMIN HODGE NICHOLS, B.S.....Instructor in Electrical Engineering
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- GERTRUDE STRICKLAND.....Instructor in Household Art
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- BERNICE BALLANCE, A.B.....Instructor in Physical Education for Women
University of Nebraska, A.B.
- RUBY EVANGELINE BEERS, B.S.....Instructor in Household Administration
Oregon Agricultural College, B.S.; graduate work, Columbia University.
- JAMES STUART BLAIR, Ph.D.....Instructor in Chemistry
University of Kansas, A.B., A.M.; Stanford University, Ph.D.
- ARTHUR BOONE.....Teaching Fellow in Pharmacy
Pomona College; University of Southern California; Los Angeles Junior
College; Oregon Agricultural College.
- JOHN COLE BURTNER, B.S.....Assistant in Industrial Journalism
Oregon Agricultural College, B.S.
- FREDA ZONA CARBAUGH, B.S.....Instructor in Secretarial Training
Kansas State Teachers College, B.S.; Northwestern University.
- PHILLIPS DEAN CARLETON, A.B.....Instructor in English
Brown University, A.B.; graduate work, *ibid.*
- ARTHUR PUTMAN CRAMER, B.S.....Instructor in Civil Engineering
Oregon Agricultural College, B.S.
- FIRST SERGEANT HERBERT GEORGE CROCKER.....Assistant to Professor of
Military Science and Tactics.
Sergeant, D.E.M.L., United States Army (Captain, Cavalry Section,
Officers' Reserve Corps, United States Army).
- ANITA KENNEDY DAVIS.....Instructor in Industrial Journalism
Oregon Agricultural College.
- JOSEPH ELLISON, Ph.D.....Instructor in History
University of Chattanooga; University of California, A.B., M.A., Ph.D.
- LEWIS ARROWOOD FLETCHER, B.S.....Teaching Fellow in Pomology
Clemson College, B.S.
- HARRY HARRISON GARDNER, B.S.....Teaching Fellow in Farm Crops
South Dakota State College, B.S.; graduate work, Oregon Agricultural
College.
- HULDA HARTUNG.....Assistant Instructor in Piano and Theory
- WILLIAM MORGAN HIGBY, B.S.....Teaching Fellow in Soils
Pacific University; Oregon Agricultural College, B.S.
- LYNN BLAIR HOPKINS, B.S.....Assistant in Pharmacy
Oregon Agricultural College, B.S.
- HELEN BOAK KAY, B.S.....Instructor in Household Art
Columbia University, B.S.; graduate work, *ibid.*
- ROY SERVAIS KEENE, B.S.....Instructor and Coach in Physical Education
for Men.
Missouri Wesleyan College; Oregon Agricultural College, B.S.
- ROY MERLE LOCKENOUR, J.D.....Instructor in Political Science
Nebraska Wesleyan University; Peru (Nebraska) State Normal School;
Standard School of Shorthand (Topeka, Kansas); Washburn College, A.B.,
LL.B.; Northwestern University, LL.M., J.D.
- LOUIS ERNEST KUEHN.....Coach of Swimming
Oregon Agricultural College.
- MARGARET BELL LAWSING, B.S.....Instructor in Art
Pennsylvania State College; Philadelphia School of Industrial Art; Co-
lumbia University, B.S.; Boothbay Art Colony.

- MARY STEWART LYLE, M.S.....Critic Teacher in Home Economics Education.
Eastern Illinois Teachers College; Purdue University, B.S.; Iowa State College, M.S.
- HARRIET FOREST MOORE, M.S.....Critic Teacher in Physical Education for Women.
Reed College; Ellsworth College; Oregon Agricultural College, B.S., M.S.
- VICTOR PIERPONT MORRIS, Ph.D...Instructor in Economics and Sociology University of Oregon, B.A., M.A.; Columbia University, Ph.D.
- EDWIN LOUIS MOWAT, B.S.....Instructor in Logging Engineering Oregon Agricultural College, B.S.
- JOHNSON ANDREW NEFF, B.S.....Teaching Fellow in Horticulture University of Missouri, B.S.
- ROBERT AMBROSE OSBORN, Ph.D.....Instructor in Chemistry Ohio Northern University, B.S.; Columbia University; Ohio State University, M.S., Ph.D.
- GLADYS LORAIN PETERSON, B.S.....Instructor in Household Art University of Washington, B.S.; graduate work, *ibid.*
- ESSIE BEE PUMPHREY, B.Des.....Instructor in Art University of Kansas, B.Des.
- ROBIN REED.....Coach of Wrestling Oregon Agricultural College.
- PAUL JOHN SCHISSLER, JR.....Head Coach of Football; Instructor in Football Tactics.
Doane College; Hastings College; University of Nebraska.
- HARRY AUGUST SCHOTH, M.S.....Instructor in Farm Crops; Assistant Agronomist, Forage Crops Investigation, United States Department of Agriculture.
Oregon Agricultural College, B.S., M.S.
- HAROLD ALBERT SEERING, B.A.....Instructor in Public Speaking University of Wisconsin, B.A.
- WILLIAM VALENTINE SKINNER.....Assistant Instructor in Wood Wind Instruments.
- HOWARD HUNTER TURNER, B.S.....Assistant Coach of Football; Instructor in Physical Education.
Western Teachers College; Lombard College, B.S.
- JACOB THOMAS TURNER, B.S.....Instructor in Industrial Education; Critic Teacher.
University of Missouri, B.S. in Ed.
- NETTIE LORENE MURRAY, B.S.....Teaching Fellow in Zoology and Physiology.
Oregon Agricultural College, B.S.
- EDITH MAE WILKINSON, B.S.....Assistant in Political Science Oregon Agricultural College, B.S.
- SERGEANT JOHN CARSON WOODBURY.....Assistant to Professor of Military Science and Tactics.
Sergeant, D.E.M.L., United States Army.

JEANNETTE BOYER XANTEN.....	Assistant Instructor in Singing
VILAS DEVALD YOUNG, B.S.....	Teaching Fellow in Soils
University of Wisconsin, B.S.; graduate work, Oregon Agricultural College.	
EDWIN ARTHUR YUNKER, A.B.....	Instructor in Physics
Oregon Agricultural College; University of California, A.B.	
MARGERY LAUTERMISCHE, B.S.....	Entomological Technician
University of Tennessee, B.S. (Agr.)	
MARGARET PEABODY, B.S.....	Instructor in Secretarial Training
Oregon Agricultural College, B.S.	
SARA VANCE, B.S.....	Assistant in Secretarial Training
Oregon Agricultural College, B.S.	
GEORGE VAN FLEET, B.S.....	Instructor in Mathematics
Montana State College, B.S.	

ADMINISTRATIVE DEPARTMENTS

EXECUTIVE OFFICE

WILLIAM JASPER KERR, D.Sc., LL.D.....	President
WILLIAM ARTHUR JENSEN.....	Executive Secretary

OFFICE OF THE REGISTRAR

ERWIN BERTRAN LEMON, B.S.....	Registrar
MARGUERITE STUDER.....	Chief Clerk
EVA BLACKWELL, B.S.....	Examiner
MARGARET SHUPE.....	Recorder

BUSINESS OFFICE

EDWIN MONROE SMITH.....	Manager
CLARENCE DOBELL.....	Auditor
SEUELL HUBBARD RONDEAU.....	Claims Department
ARTHUR ALONZO BROOKS.....	Assistant Manager; Purchasing Agent; Requisition Department.

GROUNDS AND BUILDINGS

MARK CLYDE PHILLIPS, B.M.E.....	Superintendent of Heating
ELMER POLIC JACKSON, B.S.....	Superintendent of Buildings
ARTHUR LEE PECK, B.S., B.A.....	Superintendent of Campus and Greenhouses.
DONALD BRUCE STUART, D.M.D.....	Superintendent of Light and Power
CHARLES GEORGE WILTSHIRE.....	Superintendent of Plumbing

PUBLICATIONS

EDWIN THOMAS REED, B.S., A.B..... College Editor
 DELMER MORRISON GOODE, B.A..... Associate Editor
 LAURA BELLE HEATH, B.S..... Assistant Editor
 ETHEL ALLEN, B.S..... Assistant

O. A. C. PRESS

ERNEST CHARLES HOBBS..... Superintendent
 Certified Trade Instructor under Federal and State Vocational Education Acts.

OFFICE OF DEAN OF WOMEN

KATE WETZEL JAMESON, Ph.D..... Dean of Women
 LAURA EDITH LIVINGSTON..... Associate Dean of Women

CLERICAL EXCHANGE

HELEN LUCILE HOLGATE, B.S..... In charge of Clerical Exchange

ALUMNI ASSOCIATION

ZELTA FEIKE RODENWOLD, B.S..... Secretary

STUDENT ACTIVITIES

CARL ALLEN LODELL, B.S..... Graduate Manager

HEALTH SERVICE

CLAUDE RAYMOND MATTHIS, M.D..... Medical Adviser
 HARRY SIMONSON IRVINE, A.B., M.D..... Associate Physician
 AMY CYRUS, R.N..... Nurse in Dispensary
 MINNIE SIEVERS..... Nurse at O. A. C. Hospital
 MABEL RUTH DARELIUS, R.N..... Nurse in Dispensary
 RUTH CARSON STEWART, R.N..... Nurse at O. A. C. Hospital

DORMITORIES

*SIBYLLA HADWEN..... Director of Women's Dormitories
 ELIZABETH FITZGERALD FLORA, B.S..... Assistant Director of Women's
 Dormitories.

KATHARINE BARBARA HAIGHT, R.N..... Preceptress, Margaret Snell Hall
 JENNIE MAY BREWER..... Preceptress, Cauthorn Hall
 BERTHA GORDON SCOTT..... Preceptress, Waldo Hall

CHRISTIAN ASSOCIATIONS

EARNEST WILLIAM WARRINGTON, A.M..... General Secretary, Y. M. C. A.
 KATHERINE LAUDERDALE SEAY, B.A..... General Secretary, Y. W. C. A.
 LULA HOWARD..... Employment and Housing Secretary, Y. M. C. A.

ADMINISTRATIVE AND SCHOOL SECRETARIES

MARY BOWMAN HULL..... Executive Office
 ALICE BUCHANAN..... Executive Office
 CLYTIE MAY WORKINGER..... Appointments
 JANIE STILES..... School of Agriculture
 VERA FUNK, B.S..... School of Basic Arts and Sciences

*On leave of absence during 1925-26.

LEILA HAY.....	School of Commerce
RUTH MARGUERITE APPELMAN, B.S.....	School of Engineering
OLGA BRUCHER, B.S.....	School of Home Economics
RUTH HANNAH BRIGHTMAN.....	School of Mines
WESLEYIA BRESSLER TUCKER.....	School of Vocational Education

THE COLLEGE LIBRARY

LUCY LEWIS, A.B., B.L.S.....	Librarian
LUCIA HALEY, A.B.....	Assistant Librarian
BERTHA EMMA HERSE, B.S., B.L.S.....	Reference Librarian
ELIZABETH MYRTILLA PALM, B.S.....	Circulation Librarian
ELIZABETH PROPHET RITCHIE, A.B., B.L.S.....	Cataloguer
<hr/>	
ELZIE VANCE HERBERT.....	Order Clerk and Stenographer
EVANGELINE WHITMORE THURBER, A.B.....	Reference Assistant
DORA MAY HIMMELSBACH, B.Ed.....	Technical Assistant
JOSEPHINE MORTON, A.B.....	Technical Assistant
HILDA FRANCIS MARSH, B.A.....	Circulation Assistant
GERTRUDE CARYL OLDS, B.A.....	Reference Assistant
ROSE MARCELENE ROTCHY, A.B.....	Catalogue and Order Assistant
FAY FRANCES STAHL, B.A.....	Technical Assistant
HARRIET HELEN DUNPHY, A.B.....	Circulation Assistant
LAURA CLOUD HALE.....	Circulation Assistant

EXPERIMENT STATION

WILLIAM JASPER KERR, D.Sc., LL.D.....	President of the College
JAMES TERTIUS JARDINE, B.S.....	Director of the Experiment Station
EDWIN THOMAS REED, B.S., A.B.....	Editor

HENRY DESBOROUGH SCUDDER, B.S.....	Chief in Farm Management
ERMINE LAWRENCE POTTER, M.S.....	Animal Husbandman
BENNETT THOMAS SIMMS, D.V.M.....	Veterinarian
HOWARD PHILLIPS BARSS, A.B., S.M.....	Plant Pathologist
GEORGE ROBERT HYSLOP, B.S.....	Agronomist
PHILIP MARTIN BRANDT, B.S., A.M.....	Dairy Husbandman
ARTHUR GEORGE BOUQUET, B.S.....	Horticulturist (Vegetable Gardening)
WILBUR LOUIS POWERS, M.S.....	Chief, Department of Soils
EDWARD MARIS HARVEY, Ph.D.....	Horticulturist (Physiology)
SHIRLEY JONES, M.S.....	Chemist
WALTER SHELDON BROWN, A.B., M.S.....	Horticulturist in Charge
GODFREY VERNON COPSON, M.S.....	Bacteriologist
ERNEST HERMAN WIEGAND, B.S.....	Horticulturist (Hort'l Products)
ALFRED GUNN LUNN, B.S.....	Poultry Husbandman in Charge
MARION BERTICE MCKAY, M.S.....	Plant Pathologist
HARRY GEORGE MILLER, Ph.D.....	Chemist

DON CARLOS MOTE, M.S.....Entomologist
 ORAN MILTON NELSON, B.S.....Animal Husbandman
 REGINALD HEBER ROBINSON, A.B., M.S.....Chemist
 SANFORD MYRON ZELLER, Ph.D.....Plant Pathologist
 FRANK LESTER KNOWLTON, B.S.....Poultry Husbandman

ROY CARROLL JONES, B.S.....Associate Dairy Husbandman
 CHARLES VLADIS RUZEK, B.S.....Associate in Soils (Fertility)
 WILLIAM VERNAL HALVERSEN, Ph.D.....Associate Bacteriologist
 HENRY HARTMAN, M.S.....Associate Horticulturist (Pomology)
 EARL NORMAN BRESSMAN, B.S.....Associate Agronomist
 FRED MILLER, M.S., D.V.M.....Associate Veterinarian
 CARL EPHRAIM SCHUSTER, M.S.....Associate Horticulturist (Pomology)
 CHARLES CURTIS RUTH, M.S.....Associate Agronomist

DELOSS EVERETT BULLIS, B.S.....Assistant Chemist
 EDWARD FRITCHOFF TORGERSON, B.S.....Assistant in Soils (Soil Survey)
 WILLARD WILSON YATES, B.S.....Assistant Chemist
 WILLIAM WATERS JOHNSTON, B.S.....Assistant in Soils (Irrigation)
 ALFRED WEAVER OLIVER, B.S.....Assistant Animal Husbandman
 ROSCOE ELMO STEPHENSON, Ph.D.....Assistant Soils Specialist
 BERTHA COURTRIGHT HITE, B.A.....Assistant Botanist, United States
 Department of Agriculture (Seed Analyst).

HARRY AUGUST SCHOOTH, M.S.....Assistant Agronomist, Forage Crops
 Investigation, United States Department of Agriculture.

BENJAMIN GARRISON THOMPSON, M.S.....Assistant Entomologist

LESLIE NEWTON GOODDING, B.A., B.S.....Junior Plant Pathologist,
 United States Department of Agriculture.

JOHN LEWIS.....Farm Crops Foreman

BRANCH EXPERIMENT STATIONS

ROBERT WITHYCOMBE, B.S.....Superintendent, Eastern Oregon Branch
 Experiment Station, Union.

HAROLD KARL DEAN, B.S.....Superintendent, Umatilla Branch Experi-
 ment Station, Hermiston.

DAVID EDMUND STEPHENS, B.S.....Superintendent, Sherman County
 Branch Experiment Station, Moro.

OBIL SHATTUCK, M.S.....Superintendent, Harney Valley Branch
 Experiment Station, Burns.

LEROY CHILDS, A.B.....Superintendent, Hood River Branch Experi-
 ment Station, Hood River.

GORDON GEORGE BROWN, B.S.....Horticulturist, Hood River Branch
 Experiment Station, Hood River.

ALBERT EDWARD ENGBRETSON, B.S.....Superintendent, John Jacob Astor
 Branch Experiment Station, Astoria.

EXTENSION SERVICE STAFF

31

FRANK CHARLES REIMER, M.S.....Superintendent, Southern Oregon
Branch Experiment Station, Talent.

GEORGE ADAMSON MITCHELL, B.S.....Assistant to Superintendent of
Sherman County Branch Experiment Station, Moro.

BURTON BERNARD BAYLES.....Junior Agronomist, Office of Cereal
Investigations, United States Department of Agriculture.

RAYMOND HORTON.....Assistant to Superintendent of Harney Valley
Branch Experiment Station, Burns.

HARRY HUMFELD, B.S.....Assistant to Superintendent of Umatilla
Branch Experiment Station, Hermiston.

ROBERT NORRIS, B.S.....Assistant to Superintendent of Southern Oregon
Branch Experiment Station, Talent.

HOWARD NORBERT WATENPAUGH, B.S.....Assistant Farm Crops Special-
ist, Eastern Oregon Branch Experiment Station, Union.

FLOYD MARVEN EDWARDS, B.S.....Assistant Animal Husbandman, East-
ern Oregon Branch Experiment Station, Union.

EXTENSION SERVICE

WILLIAM JASPER KERR, D.Sc., LL.D.....President of the College

PAUL VESTAL MARIS, B.S.....Director of Extension Service

MARGARET FARQUHAR COOK.....Extension Secretary

HARRY CASE SEYMOUR.....State Club Leader

WALLACE LADUE KADDERLY, B.S.....In charge of Information and
Exhibits.

FRANK LLEWELLYN BALLARD, B.S.....State County Agent Leader

JESSIE DUNLAVY McCOMB, A.M., M.S.....State Leader of Extension
Home Economics.

CALVIN JEHU HURD.....Extension Specialist in Marketing

LEONARD JOHN ALLEN, M.S.....Assistant State Club Leader

HUBERT ELMER COSBY.....Extension Specialist in Poultry Husbandry

CLAYTON LEWIS LONG, M.S.....Extension Specialist in Horticulture

HELEN JULIA COWGILL, B.S.....Assistant State Club Leader

HARRY ARTHUR LINDGREN, B.S.....Extension Specialist in Animal
Husbandry.

EDWIN RUSSELL JACKMAN, B.S.....Extension Specialist in Farm Crops

NEAL CLEMENT JAMISON, B.S.....Extension Specialist in Dairying

ESTHER BELLE COOLEY, B.S.....Assistant in Clothing, Extension Service

FREDERICK EARL PRICE, B.S.....Extension Specialist in Soils

RALPH STEPHEN BESSE, M.S.....Farm Management Demonstrator

GEORGE WALLACE KABLE, M.S.....Extension Specialist in Agricultural
Engineering.

IRA NOEL GABRIELSON, A.B.....United States Biological Survey Assistant
Biologist.

LUCY ADA CASE, B.S., A.M.....Assistant in Nutrition, Extension Service

COUNTY AGRICULTURAL AGENTS

CLAUDE CLIFTON CATE, B.S.....	Jackson County
SYLVESTER BENJAMIN HALL, B.S.....	Multnomah County
FRED BENNION, A.B.....	Umatilla County
ELVIN WINFIELD MCMINDES, B.S.....	Clatsop County
WILLIAM DOUGLAS PINE, B.S.....	Tillamook County
OVID McWHORTER, B.S.....	Washington County
PAUL CARPENTER, B.S.....	Baker County
HARRY GRANT AVERY	Union County
CHARLES ALBERT HENDERSON, B.S.....	Klamath County
WALTER ARMAND HOLT, B.S.....	Clackamas County
HERBERT BODOLLET HOWELL, B.S.....	Josephine County
WILLIAM BENJAMIN TUCKER.....	Crook County
WARREN THOMAS McDONALD, B.S.....	Deschutes County
JAMES RALPH BECK, B.S.....	Lincoln County
CYRUS RIPLEY BRIGGS, B.S.....	Benton County
BENJAMIN COONEY, B.S.....	Douglas County
CHARLES WARREN DAIGH, B.S.....	Wasco County
ROBERT WILLIAM MORSE, B.S.A.....	Morrow County
LEROY BREITHAUP, B.S.....	Malheur County
GEORGE ALLEN NELSON, B.S.....	Columbia County
RAYMOND GILBERT LARSON, B.S.....	Lake County
OTTIS SCHULER FLETCHER, M.S.....	Lane County
CLYDE RANDALL RICHARDS, B.S.....	Coos County
DALE EVERETT RICHARDS, B.S.....	Grant County
WILLIAM LEROY TEUTSCH, B.S.....	District: Polk, Marion, Yamhill Linn Counties.

HOME DEMONSTRATION AGENTS

JESSIE AIKEN GRISWOLD.....	Josephine County
EVA COMEGYS, B.S.....	Benton County
ADA BREWSTER, B.S.....	Jackson County

COUNTY CLUB AGENTS

FRANK WILLIAM SEXTON.....	Klamath County
THOMAS DEFORREST KIRKPATRICK, B.S.....	City of Portland
DAVID HONORE KENNEDY, B.S.....	Tillamook County
WILLIAM DALE KINDER, B.S.....	Multnomah County
*WALTER SQUIRE CARPENTER, B.S.....	Douglas County
*ROBERT GRAY FOWLER, B.S.A.....	Jackson County
*ISAAC MILTON COMPTON ANDERSON, B.S.....	Malheur County
ARNOLD DEFORREST COLLIER.....	Lane County

*Half time Assistant County Agricultural Agent.

General Information

ADMISSION TO THE COLLEGE

Admission as Regular Students. In order to be admitted to the Oregon Agricultural College a student must be of good moral character and must present evidence of preparation sufficient to pursue profitably the curriculum for which he desires to register. When a student can not present such evidence he must take the regular entrance examinations of the College, held at the beginning of each term. These examinations are based in general upon the outlines in "Course of Study for the High Schools of Oregon" issued by the State Department of Education, Salem, Oregon. Graduates of Oregon high schools standardized by the State Department of Education will be admitted on presentation of the required entrance units, certified by the principal or superintendent on the regulation form for this purpose.

The specific requirements for entrance to the College are as follows:

Undergraduate Curricula. Students sixteen years of age or over, who have completed 15 acceptable units of high school work in a high school recognized as standard, will be admitted to the degree curricula on presentation of a recommendation of the principal, showing work completed. It is requested that the statement be made on the "Certificate of Record" blank used by Oregon institutions of higher education. Copies of this blank will be sent by the Registrar upon application of either student or principal. The certificate, properly signed, should be filed with the Registrar of the College at least two weeks before the opening date. Applications received subsequent to this time will not be rejected, but it will be impossible to acknowledge receipt of certificates and students are likely to be delayed in completing registration.

The 15 units of work presented for entrance must include the following:

(1) *English 3 units; Elementary Algebra, 1 unit; Plane Geometry, 1 unit.**

(2) *Five additional units† to be chosen without restriction from additional English and Mathematics, Foreign Languages, Laboratory*

* Not required in Commerce.

† In the School of Commerce students will be accepted who present 2 instead of 5 additional units from subjects listed under (2), or 3 units under (2) if Geometry is not offered, provided they present at least 4 units in Commerce subjects. In case such students should subsequently desire to transfer to another school within the institution, however, they must meet all the requirements under (1) and (2); such students must, of course, submit a total of fifteen units.

Sciences, History (including Civics), and Economics. In Forestry, Mines, and all branches of Engineering, including Chemical Engineering and Military Engineering, these latter units must include $\frac{1}{2}$ unit in Higher Algebra.

(3) *Enough additional units selected from subjects credited towards graduation by standard high schools of Oregon must be presented to make a total of 15 units.*

No credit, however, is accepted in Military Drill, Spelling, Physical Training, Penmanship, or for work which may be classed as largely a student activity. One unit of Music is acceptable, and in cases where additional Music credits of a high grade are presented a maximum of two units may be allowed, provided other units in Groups 2 and 3 are properly balanced and do not represent a smattering of various subjects.

A unit is defined as one high school subject carried for five 45-minute periods a week throughout the school year. Entrance credits other than those from accredited high schools are evaluated by the Entrance Committee.

While Physics is not prescribed as an entrance requirement, students who are preparing to enter the School of Engineering are urged to take a year's work in high-school Physics where the work is available. Students in the School of Agriculture who have not had a full year of high-school Physics are required to pursue the subject for two terms of their sophomore year.

The foregoing requirements for entrance are in conformity with the Minimum Entrance Requirements for Oregon Institutions of Higher Education. In March, 1921, certain uniform requirements for entrance from high school were recommended to the various higher educational institutions of Oregon by the Committee on Higher Educational Standards of the Oregon State Teachers' Association, representing approximately all the colleges, universities, and normal schools of the state. These standard entrance requirements, as amended from time to time, have been approved by the various institutions, and are as follows:

"(a) Entrance to the colleges, universities, and normal schools of Oregon is contingent upon presentation of 15 units, with at least 10 (except schools of commerce and business administration) units in English, mathematics, foreign languages (including Latin), laboratory sciences, history (including civics), and economics.

"(b) The number of units in English should be three or four, and in these emphasis should fall upon syntax and upon composition of original character.

"(c) The remaining five units may be taken in any subject regularly or occasionally offered in the high school course of study in this state; no credit being granted, however, for penmanship, spelling, military drill, physical training, or work which may be classified as largely a student activity.

"(d) It is recommended to high schools that students taking as much as five units outside the five departments mentioned in section (a) should take significant

amounts of each subject to the end that the five units may not be merely a smattering of a number of these electives.

"(e) In addition, each institution will make such specific requirements as it may find desirable."

Graduate Curricula. Graduates of four-year curricula in the Oregon Agricultural College or in other colleges of equal rank are eligible for registration as graduate students. Prospective graduate students are required to present credentials to the Registrar as specified under "Admission from Other Colleges" showing adequate preparation for the graduate study to be undertaken.

Admission as Special and Optional Students. *Special Students.* A person who has attained the age of 21 years and who has the necessary training or experience profitably to pursue courses of college grade may, with the approval of the dean of the school in which he desires to do special work, be registered as a special student. A special student is not a candidate for a degree.

A student who has been admitted to the College as a special student may secure regular standing by the removal of entrance deficiencies, if any, in either of the following ways:

- (1) College credits earned may be counted back to satisfy entrance requirements at the rate of nine college credits for each unit of entrance deficiency.
- (2) Special examinations in entrance subjects may be taken at the date fixed for such examination at the beginning of any term. No duplication of credit, however, will be allowed.

Optional Students. An optional student is one who has met all entrance requirements but who, from the nature of the subjects elected, cannot be classified in any department or school. Optional students are under the supervision of the Dean of the School of Basic Arts and Sciences. They are not candidates for degrees.

Admission to Advanced Standing. All questions of evaluating credits in advanced standing are determined by the Committee on Advanced Standing.

Advanced Standing. Work which has been completed in the graduate year in the high school may be given advanced standing for such credits as are equivalent to the requirements of the curriculum in which the student matriculates. For any work completed in the high school prior to the date of graduation advanced standing cannot be granted, regardless of the number of units presented.

Admission From Other Colleges. Full credit is given for regular collegiate work completed in other colleges or universities recog-

nized as standard, in so far as such work is equivalent to the requirements of the curriculum in which the student wishes to matriculate. A student who has attended another college or university and desires to enter the Oregon Agricultural College should file with the Registrar an official certificate from the institution from which he wishes to transfer, giving evidence of: (1) his honorable dismissal; (2) a detailed statement of the entrance credits presented at the time of his matriculation at the other college; and (3) an official transcript of the work pursued while in attendance at the other college.

RULES AND REGULATIONS

Every student is expected to obtain from the Registrar's office a copy of Rules and Regulations for Students, giving the routine of registration, the marking system, academic standards, regulations governing student activities, organizations, fraternities and sororities, etc. Students are held responsible for familiarity with the regulations in this handbook. The information presented in the following paragraphs is limited to items of interest to prospective students prior to registration.

The College Year is divided into three terms of approximately twelve weeks each. The term dates for the current year may be found in the college calendar.

A Term Credit or credit hour represents three hours of the student's time each week for one term. This time may be assigned to work in classroom, laboratory, or outside preparation.

Residence Requirement. A residence of one year is required for graduation, during which period a minimum of 48 credits must be earned. Residence during five summer sessions may be substituted for this one-year residence requirement.

Normal Work for men consists of $17\frac{1}{2}$ credits a term during the freshman and sophomore years, 2 credits of which are for Military and $\frac{1}{2}$ credit for Physical Education; 17 credits a term during the junior and senior years. Normal work for women consists of 16 credits a term, including 1 credit a term for Physical Education during the freshman and sophomore years and $\frac{1}{2}$ credit a term during the junior and senior years. No regular student is permitted to register for more than $18\frac{1}{2}$ credits in any term without special permission from the faculty of the school in which he is registered, and not more than $20\frac{1}{2}$ credits a term may be recorded for any student without the approval of the Scholarship Committee.

Military Science and Tactics is required of all men students, six credits each year being granted for the required work of the freshman and sophomore years.* Students more than 30 years of age, those who are physically disqualified, and those who have served six months or more in the U. S. Army or Navy (except the S. A. T. C.) or who have received commissions in the Army or Navy, may be given credit in the required military work on recommendation of the faculty committee appointed to pass upon advanced credit in Military Science and Tactics. Students seeking advanced credit in Military Science and Tactics or excuse from drill must file a written petition, blanks for which may be secured at the office of the Commandant.

Physical Education is required of all students during the freshman and sophomore years and of women during the two following years also, unless they are excused on recommendation of the Professor of Physical Education for Women.

A physical examination is required of all students entering the College. In case examination of any student discloses physical defects, report is made to the Director of Physical Education, and the physical training of the student is adapted to suit, and if possible to correct, such defects.

Required Subjects. Every student before graduation from any four-year curriculum must have completed the following: English Composition, nine credits; Economics, three credits; Political Science, three credits; Finance and Administration or Sociology, three credits; Biologic or Physical Science, nine credits. If a modern language is elected, the student will be expected to continue this through two years, though credit will be given for any work completed. All men students are required to become proficient in the art of swimming.

Required English Examination. All students registering as freshmen in the College are required to take a preliminary examination for the purpose of demonstrating their preparation in English. The examination covers the fundamental principles of grammar and requires evidence of the student's ability to apply these principles in writing. Students failing to obtain a satisfactory grade in this examination are required to pass satisfactorily Eng K, a non-credit course, before registering for Eng 101.

Maximum Number of Laboratory Hours. During the freshman and sophomore years the total number of laboratory hours for any student shall not exceed twenty-one hours a week for any

* Nine credits each year are allowed for the elective work of the junior and senior years.

term, on the basis of regular or normal course credits. These maxima do not include the time spent in military drill or physical education.

Credit Requirements for a Major or Minor. The term "major work" designates the field within any school in which a student is specializing to the extent of at least thirty-six credits, of which not less than eighteen shall be in one department. Students in Commerce, Home Economics, and Vocational Education may take a "minor" in some other school by carrying not less than eighteen credits of work in that school.

Junior Certificate. Before a student is permitted to register as a junior he must obtain the junior certificate. This certificate is issued upon the completion of all of the requirements of the first two years of the curriculum.

Maximum Music Credits. Students registered in schools other than the School of Music may be permitted to carry music credits, but not more than 6 credits in Music may be applied toward degree requirements.

DEGREES AND CERTIFICATES

The Oregon State Agricultural College confers the following degrees: Bachelor of Science, Master of Science, and the usual professional degrees in applied science, such as Civil Engineer, Electrical Engineer, Mechanical Engineer, and Pharmaceutical Chemist. Graduates of major courses in the School of Music receive the Music Diploma.

Requirements for the Bachelor's Degree. The degree of Bachelor of Science in Agriculture, in Forestry, in Logging Engineering, in Home Economics, in Electrical Engineering, in Civil Engineering, in Mechanical Engineering, in Mining Engineering, in Chemical Engineering, in Commerce, in Pharmacy, in Military Science and Tactics, in Vocational Education, and in Industrial Arts, is conferred upon those who have satisfactorily completed the respective four-year curricula, each of which in the aggregate comprises 192 credits of work (including 9 credits in Physical Education) in the case of women, and 207 in the case of men (including 12 credits in Military Science and Tactics and 3 in Physical Education). Beginning with students entering in 1925-26, a minimum qualitative average, as determined by instructors' grades, must be reached for credits counted toward a degree. A graduate in any of the curricula receives the bachelor's degree in any other curriculum by completing the studies required in that curriculum.

Requirements for the Higher Degrees. Graduate work is done in the several departments of the College under the general super-

vision of a standing committee of the Faculty known as the Committee on Graduate Study. A complete outline of the work to be pursued by a student, meeting the College requirements for the particular degree sought, must be approved in advance by his major professor and the Committee on Graduate Study. Graduate students are registered by the Committee on Graduate Study in the same manner as undergraduate students are registered by the deans of their respective schools.

Candidates for any one of the higher degrees are required to complete a certain minimum of resident work, to prepare a suitable thesis, and to pass an oral examination. The resident work may be completed in a single year by a student who devotes full time to his studies; it consists of a minimum of 48 credits, including the preparation of the thesis. From 24 to 36 of these credits must be devoted to the thesis, and to allied subjects, and will constitute the candidate's major. Work towards the major of a student specializing in any of the technical departments of the College may be taken in allied pure-science departments. For example, it may be necessary for a student majoring in Dairy Husbandry to take work in dairy bacteriology with the department of Bacteriology, or a problem in dairy chemistry with the department of Chemistry, etc. From 12 to 24 credits must be selected from other departments of the College and will constitute the minor. Not less than one-half of the minor subjects must be in direct support of the major.

Each candidate for the degree of Master of Science is expected to be familiar with the principles of the scientific method and with the general facts in the history of the development of science, especially within his particular field.

Each candidate for the master's degree shall prepare a thesis upon some subject approved by the head of the department in which the student is doing his major work and by the Committee on Graduate Study. This thesis shall be of such character as to require not less than six nor more than twelve credits of work. The thesis subject, accompanied by the student's outline thereof, shall be filed with the chairman of the committee on or before the opening of the second term of the student's registration as a graduate student. The thesis must embody the results of investigation, though not necessarily original research.

Higher degrees are conferred only at the regular commencement exercises, but the committee may, under exceptional circumstances, permit the candidate to be absent from such exercises.

Prospective students may obtain from the Committee on Graduate Study full information regarding the courses of study, thesis, examination, and fees.

STUDENT EXPENSES

GENERAL FEES

The regular College fees, except for special students in Music who take no other College work, are as follows:

Registration fee, Regular Session.....	\$10.00
Payable annually by each student at the time of registration. In no case will any part of this fee be refunded.	
Registration fee, Summer Session.....	\$10.00
All students attending the summer session pay this fee at the time of registration. In no case will any part of this fee be refunded.	
Registration fee, Auditors.....	\$10.00
Any person who is not registered regularly in the institution but who has obtained permission to attend classes in a college subject is classified as an auditor and is charged this fee annually.	
Late Registration fee.....	\$1.00 to \$5.00
Students registering after the scheduled registration dates of any term are charged a late registration fee of \$1.00 a day up to a maximum of \$5.00.	
Incidental fee.....	\$5.50
This fee, payable each term at the time of registration, is levied by the Student Assembly and gives every student of the College the benefits of the Health Service, admission to all athletic events on the campus, all concerts by student music organizations, all forensic contests, all Lyceum entertainments directed by the Student Assembly, and a subscription to the student newspaper, the Daily Barometer.	
Student Union Building fee.....	\$3.00
Payable each term at the time of registration. This fee is collected at the request of the Student Assembly as a result of a tax voted by the students to produce funds for the purpose of providing a Student Union Memorial Building.	
Physical Education fee.....	\$1.50, \$1.75
Charged each student to cover the cost of locker, towels, and supplies used by the student in the gymnasium. The fee for women is \$1.50 and for men \$1.75. Men are also required to make a towel deposit of seventy-five cents.	
Class fees—	
Freshman	\$0.30
Sophomore	\$0.50
Junior	\$0.75
Senior	\$1.00
Collected each term at the request of the class of which the student is a member for the purpose of supporting the class organization.	
Non-resident Tuition fee each term.....	\$50.00
Students not residents of Oregon pay non-resident tuition fees. Students who entered the institution prior to September, 1921, are not subject to non-resident fees. Those entering after September 1, 1921, but before September, 1922, pay a non-resident tuition fee of \$20.00 a term or \$60.00 a year. Non-resident students entering after September 1, 1922, but before September 1, 1923, pay a non-resident tuition fee of \$35.00 a term or \$105.00 a year. Non-residents matriculating after September 1, 1923, pay a tuition fee of \$50.00 a term or \$150.00 a year. Non-resident students who served in the recent World War pay one-half the regular non-resident fee.	

STUDENT EXPENSES

41

Junior Certificate fee.....	\$0.50
Before a student is permitted to be classified as a junior all of the requirements of the first two years of the curriculum in which he is registered must be completed and the junior certificate obtained. A fee of fifty cents is charged for this certificate.	
Diploma fee	\$5.00
Charged each student at the time of graduation to cover costs of diploma.	
Binding fee for graduation thesis.....	\$1.00
If a thesis is prepared in meeting graduation requirements this fee is charged to cover cost of binding.	
Special Examination fee, each course.....	\$2.00
Any student upon the approval of the dean and the head of the department concerned and the payment of this fee is entitled to the privilege of taking a special examination for advanced credit. This fee is also charged if a final examination in a regular course is given in advance of the time on which it is officially scheduled.	
Change Slip fee.....	\$0.50
If the student makes any change in his official program after ten days from the registration date of any term this fee is charged for each change slip filed.	
Reinstatement fee	\$2.00
If for any reason a student's registration is canceled during a term for failure to comply with College regulations but is later allowed to continue his work the reinstatement fee is charged.	
Transcript fee	\$1.00
Each student upon request is entitled to an official copy of his record on file in the Registrar's office. If at a later date additional transcript is requested the fee will be charged.	
Military Uniform deposit.....	\$10.00
Each year this deposit is required of all men registering for work in the Military department. This money is refunded at the close of the year or when the student withdraws from the course, returning to the Military department the clothing issued.	
Physical Education deposit.....	\$0.75
Towel deposit required of all men. Refund is made when towel is turned in at the close of the course.	
Laboratory fees and deposits—	
Students are charged fees in certain laboratory courses to cover the cost of material used. These fees vary from \$0.25 to \$7.50 per course. All students registered in the School of Home Economics pay a fee of \$4.50 a term to cover laboratory and class fees for all required and elective courses in Home Economics. A fee of \$0.75 per credit is charged all students registered in other schools for courses elected in the School of Home Economics.	
Deposits are required in several of the courses to cover the cost of breakage when equipment is used where breakage is likely to occur. At the close of the term deductions are made to cover cost of breakage charged against the student, the balance being refunded. The deposits vary from \$0.50 to \$15.00 per course.	
Laboratory fees and deposits average approximately \$10.00 a term. The fees and deposits charged may be found in connection with the catalogue description of the individual courses.	

COST OF A YEAR AT THE COLLEGE

The cost of a year at the College will vary slightly with the particular curriculum pursued by the student. In general it may be said that the necessary cost of a college year averages from \$400 to \$600. Such personal items as clothing, carfare, and amusements vary according to the thrift, discrimination, and habits of the student. Some students spend more than the average indicated, while others keep their expenses at a lower figure.

Men in the R. O. T. C. receive their uniforms from the Government without cost to themselves. Men are required to supply themselves with a gymnasium suit and regulation gymnasium shoes at a cost of about \$4.00. Women are likewise required to provide themselves with the regulation gymnasium suit and shoes. The cost is about \$6.00.

An estimate of the average necessary cost of a college year is summarized below. The figure for board and room is estimated at a safe average price.

Annual registration fee.....	\$10.00
Incidental (Student) fee (\$5.50 a term).....	\$16.50
Student Union Building fee (\$3.00 a term).....	\$9.00
Laboratory fees and deposits (average).....	\$30.00
Text-books and supplies.....	\$20.00 to \$60.00
Board (for nine months).....	\$180.00 to \$250.00
Room rent (for nine months).....	\$45.00 to \$100.00
*Tuition for students not residents of Oregon.....	\$150.00

The cost of gymnasium equipment should be added. Such uniforms, however, should serve for more than one year.

It is not recommended that any student come to the College without sufficient funds available to purchase his books and supplies for one entire term, pay his first month's board and room rent in advance, and pay his first term fees. For the average student, this initial outlay will be approximately \$100, exclusive of non-resident tuition fees, the balance of the annual expenses being distributed about evenly throughout the remaining months of the college year.

BOARD AND ROOM

Halls of Residence for Women. Cauthorn, Margaret Snell, and Waldo halls, with their large airy parlors and rooms, are pleasant residences for the young women. The buildings are supplied throughout with pure mountain water, both hot and cold, electric lights, steam heat, and other modern conveniences. The rooms are furnished with single beds, mattresses, dressers, tables, and chairs. Such other materials as are needed to make the furnishings complete, including pillows, pillow-cases, sheets, blankets, bed

* See non-resident tuition fee, page 40.

spreads, curtains, rugs, and towels are furnished by the student. The bedrooms average about 12 feet by 15 feet, with one window 3 feet by 7 feet. Many of the rooms are larger and a few of them have two or three windows. All rooms in Margaret Snell Hall have two or more windows. There are a limited number of single rooms in each hall. Preference for single rooms should be indicated early. The many advantages of having a roommate should not be overlooked by the student in making her plans for college life.

The conditions of living in the dormitories are such that the College considers it a distinct advantage to the women students to live in these halls of residence. A wholesome, busy student atmosphere is maintained. Reasonable freedom is allowed, but week nights are reserved for study. All girls entering the College are expected to live in one of the dormitories, unless their parents reside in the city, or they are given special permission from the Dean of Women to live elsewhere. This permission must be obtained from the Dean of Women previous to registration.

The expenses for living for each student in the dormitories are as follows:

Room deposit.....	\$ 3.00
Room rent for each term—	
Single room	30.00
Double room	15.00
Board per week, payable in advance.....	5.00
Incidentals, such as laundry fee, electric iron fee, etc., for each term.....	2.00

The College authorities reserve the right to increase the price of room and board should advancing prices make it necessary. A corresponding decrease will be made whenever decreased prices make it possible.

The room deposit of \$3.00 must be sent to the Director of Dormitories at time of application for a room. If the student withdraws from College, this deposit will be refunded, upon presentation of the receipt, if no damage has been done to the room or furnishings. In case a student who has applied for a room does not enter the College the deposit will be refunded provided notification is sent at least one week before opening date.

Women students are not expected to arrive in Corvallis until the day the halls are opened. The dormitories will open for students on the Saturday preceding opening date.

Men's Dormitory. The rooms in the Men's Dormitory accommodate from two to four students each. The rooms all have large windows, averaging in space 4 by 4 feet for each occupant. Comfortable cots, study tables, chairs, drawers, closets, and other conveniences are furnished. Each occupant furnishes the following

articles: pillow, pillow-cases, mattress cover, sheets, blankets, bed spread, towels, soap, and individual toilet articles. Rugs, pictures, laundry bag, and similar accessories may be provided to suit the student's desires.

In Waldo Hall a cafeteria, maintained for the convenience of students residing in the Men's Dormitory, provides wholesome meals at cost. The cafeteria is open to students whether living in the Dormitory or not.

Rooms in the Men's Dormitory are assigned in the order that applications are received. Changes in the assignment may be arranged by communication with the designated authorities of the College. A deposit fee of \$3.00 is required, which will be refunded at the close of the year, less any deductions necessary to repair damage or abuse. During 1924-25 a uniform fee of \$12.00 a term (approximately twelve weeks) was charged each occupant of the Dormitory for room accommodations.

Private Board for Men Students. Board and room may be secured in private families in Corvallis. Good accommodations for self-boarding can also be secured in the city. By renting rooms and boarding themselves, students may, by careful planning, reduce the cost of living about one-half. Lists of private boarding places and self-boarding quarters can be secured from the secretary of the Y. M. C. A. after the student arrives at the College.

Student Housing Committee. The Committee on Student Housing is chiefly concerned in seeing that all students are properly lodged. It endeavors to aid students in securing suitable rooms in private homes at reasonable rental; attempts to standardize such rooms in respect to equipment, sanitation, etc.; aids organized groups of students in locating suitable building lots, confers with them regarding their plans for building or buying houses, and aids them in their arrangements for financing such projects. All leases of realty, all contracts for the purchase of lots or houses, all financial arrangements for the building of houses, are, before execution, subject to inspection, revision, and approval by the Committee on Student Housing.

SELF-SUPPORT

A considerable number of students manage in one way or another to earn the whole or a part of their expenses while attending college. The student Employment Bureaus, conducted by the campus Y. M. C. A. for men and by the Dean of Women for women, register without charge students who apply for employment. It is the purpose of the bureaus to try to supply work, regular or occasional, to all who need it. In general, the demand for work on the part of the students exceeds the supply. There-

fore, the attention of new students who intend to earn all or part of their living is called to the following results of past experience:

(1) No student should come to the College without sufficient resources for the expenses of one term. Work of any kind is much more readily secured if the student has had opportunity to familiarize himself with local conditions.

(2) No student should expect to secure employment by correspondence. It is advisable, however, to send an application to the Employment Bureau some time after September 1, and to come to Corvallis a day or two before the College opens and talk the matter over with the Employment Secretary. The positions for part-time employment are not listed, as a rule, until about the time the College opens.

(3) No student should come expecting to earn money unless he knows how and is willing to work. Only those students who do their work well can succeed in securing sufficient employment to meet their needs.

(4) There is a constant over-supply of those wishing to do teaching and clerical work. None but those having superior qualifications and experience are likely to secure employment the first term.

(5) There is a considerable demand for efficient stenographers; but generally there is not sufficient work of this kind to meet the need of all applicants.

(6) Students who can do any kind of domestic or manual labor well and who have good health can earn their board for three hours of work a day, or board and room for four hours of work a day.

(7) There is a considerable demand for experienced paper hangers, carpenters, electricians, plumbers, etc. Tools for these types of work will be found of service.

(8) A great variety of other types of work is usually available, such as janitor work, office and laboratory assistance, splitting and putting in wood, house cleaning, gardening, farm work, etc. Men who have bicycles find it convenient to have them in Corvallis in getting to their places of work.

(9) Opportunities for earning money during the summer vacations can usually be counted on. The demand for forest rangers, for field workers in engineering and mining, and for skilled workmen in engineering shops, factories, canneries, and hop-yards, and for horticultural, farm, and forestry laborers, is constant.

Women students desiring work in the dormitories should apply early to the Director of Women's Dormitories.

LOAN FUNDS

Student Loan Fund. Through the liberality of friends of the Oregon Agricultural College and through the accumulation of interest on loans, an irreducible student loan fund aggregating \$28,820.84 (November 1, 1924) has been established. 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."

Among the many contributions recorded may be mentioned the following:

R. A. Booth.....	\$ 1,010.00
Clara Humason Waldo.....	150.00
Ashby Pierce Fund.....	500.00
R. M. Johnston.....	100.00
L. J. Simpson Scholarship.....	1,000.00
Ben Selling	2,000.00
College Folk Club.....	344.00
Agricultural Club, Oregon Countryman..	200.00
Faculty	2,106.17
Winter Short Course Students.....	144.50
Piano Practice Fund.....	200.00
Class Donations	257.65
Y. M. C. A.....	225.00
O. A. C. Rifle Club.....	110.00
Salem O. A. C. Club.....	85.00
O. A. C. Barometer.....	250.00
Domestic Science Dining-room (Panama- Pacific International Exposition, San Francisco)	1,000.00
Bonds during the war.....	200.00
a. Waldo Hall Club	
b. Cauthorn Hall Club	
c. Miners Club	
Late Registration fees, change slip fees, etc.	12,108.45

The J. T. Apperson Agricultural College Educational Fund. By the will of the late Hon. J. T. Apperson, Regent of the College since its foundation, a fund amounting to between twenty-five and forty thousand dollars 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 the Oregon Agricultural College." The income from this estate is to be loaned to students at a low rate of interest. Applicants for loans must be recommended to the State Land Board by the President of the College and the State Superintendent of Public Instruction.

The Masonic Educational Fund. The Grand Lodge of the state of Oregon has assigned two thousand dollars (\$2,000) to a fund which may be used by needy sons and daughters of Master Masons. Loans from this fund are made at the discretion of the Trustees of the Grand Lodge, upon the recommendation of the

President of the College and the approval of the master and wardens of the Lodge at Corvallis. Loans to any one student may not exceed three hundred dollars (\$300) in a school year, subject to repayment in full or in installments at the borrowing student's earliest convenience.

The 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 in amounts of not more than three hundred dollars (\$300) in a school year. Notes are for one year and renewable at the pleasure of the Worthy Matron, and shall draw four percent interest. Loans are made upon honor, no security being asked, and will be made by the Trustees of the Grand Lodge on the recommendation of the President of the institution where 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 Harmon Foundation. This corporation of New York City, founded for the sake of assisting worthy self-supporting students in the last two years of their collegiate courses, assigned two thousand dollars (\$2,000) per annum to the Oregon Agricultural College. This money is loaned under conditions novel to this Foundation, perfectly protecting the principal yet requiring no security from the student. Loans made under this fund must be repaid by regular payments begun not later than twelve months after graduation or the leaving of school. A five-year affiliation with the College by this Foundation is contemplated.

The Simon Benson Fund. Mr. Simon Benson of Portland has placed the sum of two thousand dollars (\$2,000) on deposit with the Loan Committee for the assistance of needy and worthy students. These funds are administered in the same manner employed with the other moneys of the regular Student Loan Fund.

Bernard Daly Educational Fund. 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 a board of trustees who select candidates annually from a list of applicants recommended by the county judge and county school superintendent.

PRIZES

The Clara H. Waldo Prize of one hundred and forty dollars is an award annually made in the proportions of fifty, forty, thirty, and twenty dollars respectively to the woman of highest standing registered as a regular student in one of the degree curricula in the senior, junior, sophomore, and freshman year on a basis indicated below under "The A. J. Johnson Prize."

The A. J. Johnson Prize of one hundred and forty dollars is an award annually made in the proportions of fifty, forty, thirty, and twenty dollars respectively to the man of highest standing registered as a regular student in one of the degree curricula in the senior, junior, sophomore, and freshman year.

In the distribution of the Waldo and Johnson prizes, the committees having charge of the awards are guided by the following points:

- (a) Proficiency in scholarship.
- (b) Success in student activities.
- (c) Qualities of manhood or womanhood.
- (d) Qualities of leadership.

The Joseph H. Albert Prize of twenty-five dollars is an award annually made to the senior student who is adjudged by a joint committee of faculty and students to have made the greatest progress toward the ideal of character, service, and wholesome influence.

The J. M. Dickson Scholarship of one hundred dollars, established by the estate of the late J. M. Dickson to commemorate his service to the dairy industry of the state and his faith in education as a factor in the development of agriculture, is awarded annually at the end of the junior year to the student majoring in Dairy Husbandry who in the opinion of the departmental staff excels in scholarship and initiative, and gives promise of attaining leadership in some phase of the dairy industry.

The Mountain States Power Company Prize. This prize, offered by the Mountain States Power Company, is a silver loving cup presented to the senior man who during his entire college career has maintained a high standard of scholarship and manhood and has excelled in athletics.

The Jacob Reichart Prize. Through the generosity of Mr. Jacob Reichart, whose sons were prominent in debating while at the College, an award of twenty-five dollars is made annually to the student showing the greatest ability in forensics.

The Farley Doty McLouth Memorial. To that student who during his or her art course at the College has achieved by means

of highest ideals and worthiest efforts the keenest appreciation of the beautiful a prize of fifty dollars is to be given annually, beginning with the year 1923-24, the prize being known as the Farley Doty McLouth Memorial.

Oregon State Society of Certified Public Accountants Scholarship. For the purpose of stimulating the students in Commerce to achieve the utmost in the study of accounting, the Oregon State Society of Certified Public Accountants offers an annual scholarship, consisting of books on accounting to the value of \$25.00. The faculty of the School of Commerce designate the student most worthy of the award.

HEALTH SERVICE

The College Health Service, inaugurated in 1916, is a department maintained with the aim of promoting the health of all the students. This aim is sought through medical examination, through consultation during office hours, through attendance of the College physician upon those in hospital and those ill at their residences, through sanitary inspection, and through supervision in case of epidemics. The services of the department, except in so far as the welfare of the College community may require, are not imposed upon any student or group of students. They are available, however, to all students who seek them voluntarily.

The department staff comprises two regular full-time physicians, whose headquarters are at the Health Service Building; two resident graduate nurses, who are in attendance at the same building, and two graduate nurses who are in attendance at the hospital, located at Ninth and Harrison Streets.

The Health Service is maintained by funds derived from the regular student fees. The amount allotted to the Health Service is determined by the Board of Control but cannot be less than \$5.00 for each full year student. The College physicians may be consulted during office hours by any student. They give medical examinations by appointment, and medical advice and attention to those who are ill. They authenticate excuses for absences from College work because of illness.

Patients who require hospital service for illness incurred while in College will be accommodated at the O. A. C. student hospital, where they receive free hospital service for a period not exceeding ten days. Hospital fees at the rate of \$2.50 a day will be charged for periods exceeding the ten days covered by the student fees.

HISTORY AND ORGANIZATION

LOCATION

The seat of the Oregon Agricultural College is Corvallis, a city of 7,500 inhabitants, situated at the head of navigation on the Willamette River. As the name implies, it is in the heart of the Willamette Valley, famous for its varied and abundant resources. It is readily accessible by steam and electric railway from all parts of the state, the main-line Southern Pacific steam trains all connecting with Corvallis, and both the "West-side" Electric and the Oregon Electric trains running into the city. In addition to these north-and-south railways, an east-and-west railway running through the city connects the College with the Cascade Mountains on the east and the ocean, at Newport, on the west. Both Pacific Highways, one on the east and the other on the west side of the Willamette River, are completely paved from Portland to Corvallis. Corvallis has free mail delivery, excellent paved streets, good schools, many churches, attractive residences, a modern sewer system, and a first-class gravity water system supplied from springs on the slopes of Mary's Peak, the tallest mountain in the Coast Range, sixteen miles to the west.

Situated on high, well-drained land, open to the invigorating sea breeze, Corvallis is one of the most healthful cities in Oregon. The climate is remarkably equable, and severe storms are almost unknown, summer or winter. The average annual temperature for 28 years (1890-1918) was 55.01 degrees Fahrenheit, and the average annual rainfall for the same period was 42.76 inches. The lowest temperatures for the five years 1914 to 1918 were respectively 13, 21, 8, 14, and 19 degrees Fahrenheit in December and January; and the highest temperatures for the same years, in July and August, were respectively, 100, 97, 99, 103, and 99 degrees Fahrenheit.

The glens and gorges of the Coast Range, beginning only a few miles west of Corvallis, the distant splendor of the Cascades, sixty miles to the eastward, with their wealth of trees and the perennially snow-capped peaks—Hood, Jefferson, and the Three Sisters—present a constant panorama of picturesque mountain scenery. With such an environment, Corvallis is an ideal location for a college and a home.

THE LAND-GRANT

By an Act of Congress, approved by President Lincoln, July 2, 1862, a grant of land to the amount of thirty thousand acres, or its equivalent, was made to each state in the Union for each senator and representative in Congress to which the state was entitled by the apportionment of the census of 1860. The proceeds under

this Act were to constitute a perpetual fund. The principal of this fund was to remain forever undiminished; but the interest arising from the fund was to be inviolably applied by each state that should avail itself of the benefits of the Act by the support and maintenance of a "college where 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 such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." Ninety thousand acres of land were apportioned to Oregon; and by an Act approved October 9, 1862, the Legislative Assembly of Oregon accepted the provisions of the Congressional law.

The legislature of 1868 provided for the location of the land received under the Act of 1862, and as there were no state colleges in Oregon at that time designated Corvallis College, a private institution in Benton county under the control of the Methodist Episcopal Church, South, as the recipient of the interest on funds to be derived from the sale of this Government land. For a number of years, however, none of the land was sold, and the legislature made small annual appropriations for the support of the institution.

In 1885, the church voluntarily relinquished its claim on the funds of the College, and the state assumed entire control of the institution. The legislature of that year provided for the "permanent location of the State Agricultural College at Corvallis, in Benton county," on the condition that the citizens of said county should, within four years, erect on the "farm containing thirty-five acres in the immediate vicinity of said city, known as the Agricultural College Farm, brick buildings for the accommodation of said State Agricultural College, at a cost of not less than \$20,000." During the summer of 1887, the cornerstone of the building erected by the citizens of Benton county was laid by the Governor of Oregon amid impressive ceremonies.

This structure, now known as the Administration Building, was the nucleus around which other buildings soon began to cluster, as necessity and growing interest demanded. For a year or two there was ample room; but, as the institution grew, more land was needed and provided, and the institution now owns, as compared with the thirty-five acres originally comprising the campus and grounds, three hundred and forty-nine acres; and as compared with one structure, thirty-nine. There has also been a marked increase in the attendance, from ninety-seven to approximately five thousand students. Thirty years ago, most of the

students came from Benton and neighboring counties. Today, every county in Oregon, forty-two other states, and eighteen foreign countries are represented. The increase in the number of students called for an increase in the number of the faculty. This body, from the number of five in 1884, has grown until it now numbers more than three hundred. Other features usually found in connection with progressive educational institutions have grown in equal ratio. The curricula have been strengthened, the standards, both for entrance and graduation, have been advanced, organization has kept pace with development, and other improvements have been made from time to time, which have added to the thoroughness and efficiency of the work.

THREE GRAND DIVISIONS

The Oregon Agricultural College is organized into the three grand divisions that characterize the work of the land-grant colleges throughout the country; namely, Resident Instruction, Experiment Station, and Extension Service. Resident Instruction, which includes all work of teaching students at the institution, is the most distinctive feature of the College life. It has always been regarded as of first importance, and will doubtless continue to be so regarded, in spite of the increasing usefulness of other divisions of work. The Experiment Station, through systematic experiments, investigation, and research, is engaged in a search for fundamental truth. Its work is of great importance; for without it, the work of the other two grand divisions would soon become sterile and ineffective. The Extension Service includes all means of imparting the message of the College to the people in their own communities. It is virtually an effort to make practical and more or less immediate application throughout the state of the available truths worked out by the Experiment Station or used for resident instruction.

PURPOSE AND SCOPE

The purpose of the College is to provide, in accordance with the acts of Congress under which it is maintained, a liberal and practical education—an education that will afford the training required for efficient service both in different branches of industry and in civic duties. The distinctive technical work covers the three great fields of production, manufacture, and commerce. Special attention is given to the application of science. All the practical work in the laboratories, in the shops, in the orchards, and on the farm, is based on scientific principles. While the industrial or technical work is emphasized, the importance of a thorough gen-

eral training, of mind development, and of culture, is recognized in all the work of the institution. The object is to meet the demand for a broad and general education, supplemented by special technical training. State and Federal support impose upon the College the obligation of giving training for true citizenship.

The work, therefore, covers a broad field, including technical courses in the different phases of agriculture, forestry, home economics, engineering, mining, commerce, pharmacy, vocational education, military tactics, and industrial arts; with the necessary training in the basic subjects of mathematics and the biologic and physical sciences; and also the general training in language, literature, history, economics, political science, civics, and physical education, which constitutes an essential part of a liberal education.

ADMINISTRATION

Board of Regents. The general government of the College is vested in the Board of Regents, composed of thirteen members, of whom the Governor, Secretary of State, Superintendent of Public Instruction, and the Master of the State Grange are ex-officio members. The nine other members are appointed by the Governor with the approval of the State Senate, and hold office for a term of nine years. Under a law of the State Legislature passed in 1885 the Board of Regents constitutes a body corporate under the name of "The Board of Regents of the State Agricultural College * * * with power to sue and be sued and to make contracts," and to enact such regulations as may be necessary for the maintenance and development of the College.

The Administrative Council is composed of the President of the College, the deans of the several schools, the Director of the Experiment Station, the Director of the Extension Service, the Dean of Women, the Professor of Military Science and Tactics, and the Executive Secretary. It is the function of the Administrative Council to consider and determine the larger questions of institutional policy and administration, particularly those affecting more than one school or division, in so far as these are not reserved to the Regents or to the President. Meetings of the Administrative Council may be called by the President or the Executive Secretary.

The College Council is composed of the President of the College and all officers of administration and instruction with the rank of professor, associate professor, or assistant professor. It considers such matters of general policy and institutional interest, particularly those involving the welfare of the institution as a

whole, as may be referred to it by the President or the Administrative Council.

The College Staff is composed of all members of the resident and field staffs of the Resident Instruction, Experiment Station, and Extension divisions of the College. Its function is concerned primarily with matters pertaining to the general welfare of the College. Meetings are held at the call of the President.

School Faculties. Each school of the College has its own faculty consisting of the dean, professors, associate professors, assistant professors, and instructors. Depending upon size of staff, school faculties may be further organized into groups of ranking professors or committees for such definite administrative functions as may constitute a feature of school policy. The faculty of each school is organized for the purpose of administrative matters relating solely to its own unit of administration. Meetings of school faculties are held at the call of the dean. The President is ex-officio a member of all school faculties.

Departmental Faculties. Each department has its own faculty, consisting of all members of its staff whether engaged in instructional, research, or extension activities. The departmental faculty considers matters which concern primarily its own internal policy and problems, and meets on call of the head of the department, who is its presiding officer. The school dean is ex-officio a member of all departmental faculties.

The Experiment Station Staff includes the President of the College, the Director of the Experiment Station, the Secretary of the Experiment Station, the superintendents of the branch experiment stations, the heads of the various departments of the School of Agriculture, the heads of departments of the School of Basic Arts and Sciences who are also heads of corresponding Experiment Station departments, and all assistants engaged in research and experimental work. The members of this staff are engaged in the investigation of problems encountered in the development of the agricultural interests of the state. They distribute, by correspondence, circulars, and station bulletins, information regarding their investigations.

Extension Staff. The Extension Service Staff includes the President of the College, the Director of Extension Service, the Secretary of Extension Service, the State Leaders and Assistant State Leaders of County Agents, Home Demonstration Agents, and Boys' and Girls' Club work, Extension Field Specialists in Dairying, Animal Husbandry, Home Economics, Farm Crops,

Horticulture, Poultry, Farm Management Demonstration, Organization and Markets, and Rodent Control, County Agents, Home Demonstration Agents, and County Club Agents.

The Students. The College does not undertake to prescribe in detail either its requirements or prohibitions. Students are met on a plane of mutual regard and helpfulness. Since the advantages of the institution are provided at public expense, the students are under special obligation to perform faithfully all their duties, not only to the College, but also to the community and to the state. Whenever the deportment of any student is such that his influence is inimical to the interests of the institution, he will be relieved from further attendance.

GROUNDS AND BUILDINGS

THE COLLEGE GROUNDS

The college grounds comprise three hundred and forty-nine acres. That part of the grounds, ninety-one acres in extent, lying immediately about the several buildings, east of Cauthorn Avenue, and usually designated as the lawns and campus, is tastefully planted with both native, exotic, and ornamental trees, shrubs, and herbs. The tract of one hundred and forty-three acres used for the farm, garden, and orchard operations is so plotted and planted as to meet the demands of the various lines of work and still conform to a general scheme of landscape embellishment. This portion occupies a slightly elevated and gently undulating site wholly within the western limits of the city of Corvallis. Drives and walks traverse the campus in all directions, thus rendering every objective point easily accessible.

In addition to the above plot, one hundred and fifteen acres, comprising the College south farm, including the horticultural and poultry tracts, lie just south of the city limits. Approximately eight hundred acres are also under lease for farm purposes.

COLLEGE BUILDINGS

The following brief descriptions will convey a general idea of the principal buildings and the purposes for which they are used. The location of the various buildings is shown on the map elsewhere in the Catalogue. An alphabetical list is given in the index under "Buildings."

The Administration Building is a three-story brick structure, 90 by 120 feet, containing recitation rooms and the offices of the Registrar, the Entrance Committee, the Business Manager, and the

Director of the School of Music. Centrally located and on a slight eminence, it commands an unsurpassed view of the campus, the city of Corvallis, and the picturesque Cascades.

The Library Building, located west of the Administration Building, consists of two stories and basement in front and three stories and basement at the back. It is built of red brick and gray terra cotta, presenting a quiet and dignified appearance, in keeping with the use, fundamental to education, to which it is put. The most modern and effective system of lighting, heating, and ventilating is installed. The building is ample to accommodate the growth of the library for many years, and its architecture permits stack expansion as time and growth demand it.

The southeast room of the basement, which has recently been completed for use, accommodates the College Museum. The southwest room is used for storage of documents, newspaper and periodical files. In the northwest portion of this floor are a lecture room and office for the History department. The first floor consists of an entrance hall, the technical periodical room, binding room, an auditorium for classes too large to be accommodated by the classroom of ordinary size, one other classroom, the office of the Dean of Women, and coatrooms. The second and third floors at the front are occupied by the main reading room, ample to seat more than three hundred for reference work. Back of this room on the second floor are the faculty seminar room adjoining the stacks, the periodical reading room, offices, cataloguing, and other workrooms. The third floor consists of comparatively small rooms designed ultimately for seminar rooms for the use of such departments as will make the library their chief laboratory; however, under present crowded conditions on the campus, this story is used for offices and laboratories of the department of Public Speaking and Dramatics and the office of the Dean of the School of Basic Arts and Sciences.

The northwest part of the Library contains the fireproof steel stack room, housing in safety the book collections and permitting their easy and effective use. An electric elevator and a book-lift connect all decks of the stack room.

Science Hall, situated southeast of the Administration Building, and constructed of gray granite and sandstone, covers a ground space of 85 by 125 feet, has three stories and basement, and contains fifty-five rooms. Within it are housed the department of Chemistry, with its various laboratories, recitation rooms, and lecture halls, together with the offices and laboratories of the department of Chemical Engineering and of the Experiment Station chemists.

The Armory is situated about three hundred yards south of the Administration Building. It is one of the largest of its kind in the United States and is built of concrete and steel, 126 by 355 feet. The drill hall portion has an unobstructed area of 36,000 square feet. The arms room, offices, and drill hall afford facilities for the accommodation of 1,000 men.

The Men's Gymnasium, situated on Jefferson Street and adjoining the main athletic field, is now practically complete. The central unit, 90 by 150 feet in size, provides a main hall with 13,500 square feet of floor space for three regulation basket-ball courts and space for general gymnasium and indoor athletic work. A deep balcony has been constructed around three sides. This hall is occasionally used as an auditorium for large assemblies and entertainments. The men's lockers, dressing-rooms, the showers, the departmental offices, and a large lobby for receptions, are also located in the central unit. The east wing, 52 by 96 feet in dimensions, provides an auxiliary gymnasium for apparatus work, three hand-ball courts, two wrestling and boxing rooms, and one large room for volley-ball. The new west wing, 52 by 96 feet, provides an additional boxing and wrestling room, bowling alleys, hand-ball and squash courts. The fourth unit provides a natorium 50 by 100 feet in size, of white tile construction, lighted at the bottom with special electric lights, and equipped with the most modern diving boards, and with a refiltration and violet-ray system which keeps the water sterile. The pool, which is one of the largest and finest in this part of the country, is surrounded by a gallery capable of seating fifteen hundred spectators.

The Women's Gymnasium is situated about two hundred yards south of the Administration Building, and is erected against a gently sloping bank on Jefferson Street. The structure, 70 by 120 feet, is built of stone and wood, and comprises a basement, or first floor, facing east, with the main floor above it, having a bank entrance on the west end. The first floor of the building is devoted to locker rooms, dressing-rooms, bathrooms, and offices, together with a rest room and a special room for corrective gymnastics. The second floor consists chiefly of one large gymnasium room, which is also frequently used as a lecture hall, assembly room, and social center for moderate-sized gatherings. This room is surmounted by a balcony running-track, suspended from the trusses. The room affords facilities, in a court 79 by 54 feet in dimensions, for basket-ball, indoor baseball, tennis, and various winter and indoor games.

The "Y" Hut. The "Y" Hut is 60 by 110 feet in size, consisting of one main floor with balconies. The auditorium has a

stage, moving picture equipment, large fireplace, and writing and game tables. Smaller rooms adjoining are used for many purposes, such as committee meetings, billiards, the Secretary's office, and library. Opening from the balconies are offices of various student activities.

Shepard Hall, the student building now under the auspices of the Y. W. C. A., was erected as a tribute to the memory of Clay Shepard, who gave his life to the cause of cleaner and truer citizenship as exemplified in student life. The basement contains a swimming pool, shower-baths and locker rooms, kitchen, wood room, and accessories. The first floor contains a large lobby, which is used for social events and as a general gathering center, the offices of the General Secretary, a public office, and a combined cabinet and check room. The third floor is used for offices and committee rooms.

Agriculture Hall, standing southwest of the Administration Building, is the largest structure on the campus. It is an imposing edifice of brick and sandstone, consisting of the central or administrative section, the north or Agronomy wing, and the south or Horticultural wing.

The central section is 66 by 140 feet, four stories and basement, and contains conveniently arranged and well lighted classrooms, laboratories, and offices. On the first floor are the offices of the Director of the Experiment Station, the Dean of the School of Agriculture, the Director of the Extension Service, the State Leader of Boys' and Girls' Clubs, and other offices of the Extension Service. The second floor is occupied by the offices of the State Leader of Home Demonstration agents and her assistants, together with the offices, classrooms, and laboratories of the department of Animal Husbandry; the third floor, by the departments of Zoology and Entomology with their respective museums; and the fourth floor, by the department of Bacteriology.

The north or Agronomy wing is 72 by 130 feet, three stories high. The first and second floors, occupied by the departments of Soils, Farm Management, Farm Crops, and Drainage and Irrigation, contain, in addition to the offices of these departments, rooms variously devoted to laboratory and class purposes. The third floor is occupied by the department of Art.

The south or Horticultural wing is 72 by 130 feet, three stories high. In the basement are located laboratories for plant propagation, spraying, vegetable preparation, and fruit packing. The basement also contains the general storage rooms for the department, and rooms which are especially adapted for the storage of fruits. The first floor contains the offices of the department of Horticultural

ture, the research laboratory, systematic pomology laboratory, and three large lecture rooms. The second floor contains the offices and museums of the department of Botany and Plant Pathology, recitation rooms and student laboratories. The third floor contains the horticultural museum and horticultural herbarium, photograph room, large student lecture room, drafting rooms, lecture rooms, and office of the Landscape Gardening section.

Greenhouses. A range of greenhouses aids the student in his studies in commercial greenhouse work. The range is made up of five even-span houses, three 20 by 90 feet, and two 20 by 33 feet, making the total area under glass 6,720 square feet. Each of the large houses has been divided into sections thirty feet long, so that the entire space in each may be devoted to a single crop. Of the two smaller houses, one is given up to research work, and one to general plant propagation. Such crops as carnations, chrysanthemums, violets, palms, ferns, general pot plants, and forced vegetables, such as tomatoes, lettuce, and cucumbers, are grown in these houses.

The Horticultural Products Building is of brick, 46 by 72 feet, three stories high, with a new one-story wing 46 by 60 feet. The inside brick walls are enamel-coated, and the laboratory floors are of water-proof material. The building is equipped with a 40-horse-power boiler for high-pressure steam. Ample provisions are made for hot and cold water and electric power. In the basement are located boiler and storage rooms, also juice room for the manufacture of fruit juices and vinegars. This room is equipped with hydraulic press, centrifuge, multiple drum, silver-lined filter and settling vats. On the first floor is located dehydrating equipment, such as three-tunnel Oregon drier with recirculation, and a steam heated experimental dehydrator of one-ton capacity. This is automatically controlled by compressed air. Preparation machines, such as power peelers, slicers, washers, etc., are located in this room. This floor also contains equipment for the manufacture of jams and jellies on a large scale. Among the installations are steam-jacketed kettles (capacity 50 gallons), vacuum pans, and par-boilers and similar equipment. A large research laboratory for chemical investigation of by-products of the fruit industry is also located on the first floor. On the second floor are located office and lecture rooms. The new wing, occupied entirely by the canning laboratory, is equipped with two complete lines of canning machinery. Cooling facilities are provided for the proper handling of the canned products. The new wing is of steel-girded construction, the interior finished in white enamel, lighted by windows around three sides and saw-tooth skylights, and amply ventilated.

Dairy Building. Just north of Agriculture Hall is located the Dairy Building. The general scheme of both outside and inside finish is similar to that of Agriculture Hall. The structure is 54 by 141 feet, three stories high. On the first floor are the offices of the Dairy department and laboratories for buttermaking, cheesemaking, and market milk instruction, including a boiler and engine room and student lockers. On the second floor are the testing laboratory, advanced laboratory, veterinary laboratories, etc. The third floor is temporarily occupied by the department of Mathematics with the exception of a general lecture room, extending across the south end of this floor, and having a seating capacity of two hundred.

The Veterinary Building, a frame structure 56 by 65½ feet, is used for both instructional and Experiment Station work. The front part of the building consists of two rooms, lighted by skylights and large windows. One of the rooms is a small amphitheater, with a seating capacity of about one hundred and twenty. The arena is sufficiently large for casting animals for surgical work. The opposite room is used for dissection and for holding autopsies. The back part of the building is divided into two stories. The first floor consists of a dressing room, toilet, and shower-bath room, drug and instrument room, and stalls. The second floor has space for storing feed, and for housing guinea pigs and rabbits.

The Stock Judging Pavilion. The Animal Husbandry work of the College is greatly facilitated by a judging pavilion, which provides comfortable and commodious quarters for all of the demonstration work with livestock. The main room is 40 by 90 feet, well lighted and heated. A movable partition is provided whereby this large room may be divided into two smaller ones, each large enough for all ordinary purposes.

Farm Mechanics Building. A modern building is provided for the Farm Mechanics work. It is a well-lighted brick building, having a large operating floor, a classroom, a locker room, shop, and tool-room on the first floor. The operating floor is of cement and is roomy enough for demonstration and for the operation of the heavier farm machines. A gallery surrounding the operating floor provides space for the lighter farm implements such as tillage, haying, and harvesting machines. The building is equipped with shafting, belting, and power for operating and testing various machines, and a large well is provided for making pump tests. A machine shed 52 by 56 feet, with concrete floor, is located directly south of the Farm Mechanics Building.

Commerce Hall, completed during the summer of 1922, is located north of the Dairy Building with entrances from both the north and the south. It is of the "U" type, 186 feet long and 67 feet wide, with wings 28 by 107 feet. There are three floors above a well-lighted ground floor. The most approved methods of heating, lighting, and ventilating are employed. The new building houses the offices of the President and the Executive Secretary; the Dean of Men; the College Editor; the Clerical Exchange; the O. A. C. Press; offices of student publications; the department of Industrial Journalism; the Bureau of Organization and Markets; the executive office of the School of Commerce; the departments of Economics and Sociology, Finance and Administration, Political Science, and Secretarial Training; and that part of the department of Mathematics which deals with commercial Mathematics.

Apperson Hall, situated about one hundred and fifty yards northeast of the Administration Building, is 90 by 120 feet in size, three stories high, constructed of Oregon gray granite, sandstone, and terra cotta. With the addition of the third story during the summer of 1920 and complete remodeling of the interior the structure is virtually a new building. The first floor contains offices, laboratories, and classrooms for the departments of Electrical Engineering and Light and Power. The second floor contains offices of the departments of Physics, Highway Engineering, and Electrical Engineering, and various classrooms and laboratories. The third floor contains offices for Irrigation Engineering, Civil Engineering, and Railroad Engineering, four drawing rooms, and five class and lecture rooms.

Engineering Laboratory. The Engineering Laboratory, recently completed, is a brick and concrete building 63 by 220 feet, three stories high. It is located on Monroe Street, directly north of the Mines Building and adjacent to the Mechanic Arts Building.

The main laboratory is 40 by 220 feet and includes three principal divisions: (a) a materials laboratory occupying about one-third of the building at the east end; (b) a hydraulics laboratory occupying the middle third; and (c) a steam and gas engine laboratory occupying the west end of the building. Each of these divisions has floor space on the basement, main floor, and mezzanine or gallery floor. All are served by a five-ton electric traveling crane. The south part of the building contains offices, recitation rooms, drafting rooms, and special laboratories, these last including highway materials laboratory, fuel and oil testing laboratory, metallography laboratory, and automotive laboratory. A 100-horse-power water tube boiler is located in the basement to furnish heat for the building and steam for experimental use in the laboratory.

Mechanic Arts Building is a modern, well-lighted structure of brick, with cement foundations, 52 by 52 feet, two stories high, flanked by a one-story wing on the east, 40 by 220 feet, and a similar wing on the south, 40 by 200 feet. The central portion contains the office of the Dean of the School of Engineering, a display room for student work, a tool-room for the machine shop, and a finishing room for the wood shop. On the second floor is a general drafting room with a blue-print room and a dark room adjoining, and two offices. The south wing contains the main wood-working shop, 40 by 97 feet, recitation room, varnishing room, drawing room, a store room, and the Industrial Arts office. The east wing contains the machine shop, 40 by 80 feet, the blacksmith shop, 40 by 100 feet, store room for coal and iron, lockers, and toilet rooms.

The Foundry, which is located immediately south of the blacksmith shop, is built of brick. It contains one 22-inch Colliau cupola for melting iron, one brass furnace, one portable core oven, one stationary core oven for large work, one twelve-hundred-pound crane ladle, one eight-hundred-pound crane ladle, and several smaller ladles. It contains also one crucible brass furnace, one two-ton jib crane, one post crane, one No. 2 Delano pulley molding machine, one tumbling barrel for cleaning castings, and a liberal supply of smaller tools, flasks, etc.

The Forestry Building. The three-story Forestry Building, 80 by 136 feet, constructed of brick, houses the work in forestry and logging engineering. This building contains roomy laboratories for work in silviculture, dendrology, mensuration, forest protection, technology, drafting, and logging engineering. As rapidly as material can be assembled these laboratories are being supplied with the various instruments and equipment which the peculiar work of each requires. In addition to the laboratories, space is to be devoted to a collection of manufactured wood products, designed to show the various uses to which wood may be put and to a forest museum in which will be assembled large specimens of all commercial woods of the United States. All available publications dealing with forestry and logging subjects are provided for the use of students. Portions of the building are used temporarily by the School of Vocational Education, the department of English, and the department of Poultry Husbandry.

The Home Economics Building lacks only the west wing to complete the original plan of a central unit, two connecting links, and two wings. As it now stands the building measures about 215 feet in length and 120 feet in total width. It is located directly

west of the Dairy Building and east of the Farm Mechanics Building, facing the Men's Gymnasium and the Forestry Building, across the West Quadrangle to the south. It consists of three stories above a high basement, and is built of brick and terra cotta. Heating, lighting, and ventilating systems of the most modern type are installed, and every provision—including an electric elevator, rest room, reading room, lockers, and dressing room—is made for the comfort and convenience of the young women pursuing work in Home Economics.

Large laboratories and lecture rooms for food preparation and for household arts are now amply provided in this building for the accommodation of all students. Adequate office room is also available for members of the Home Economics staff, and special laboratories are devoted to weaving and dyeing, laundry, etc. A feature of the building that affords opportunity for practical instruction in dietetics and institutional management is the large dining-room on the third floor of the central unit, capable of seating 300 people, and the kitchens, with modern equipment, where food is prepared for this dining-room. Another feature of practical value to all students is the group room arrangement showing two types of effective equipment for a home in accordance with a low or moderate family income, the object of each being to illustrate a kitchen, dining-room, and living-room proportioned, arranged, and equipped with the least outlay for the largest degree of genuine comfort, convenience, and charm.

Home Management House. The Home Management House, located on Monroe Street north of the Library and Shepard Hall, is an important part of the Home Economics equipment. It is a large residence built for family life but now used as a campus laboratory for advanced students in Home Economics. Groups of senior women occupy this house and carry on all the activities of home life, including the care of a child.

The Mines Building, 65 by 81 feet in dimensions, located northeast of the Library and about one hundred yards northwest of the Administration Building, is one of the newer structures. It is a fine four-story building, constructed of brick, trimmed with stone, and similar in type to all the newer buildings on the campus. The first floor of the building contains the main offices and the assaying and the metallurgical laboratories. The basement contains the crushing and sampling rooms, stock rooms, and ore-dressing laboratory. On the second floor are drafting, lecture, and classrooms. On the third floor are the geological museum, mineralogical and petrological laboratories. All the laboratories are provided with water, gas, and electric lights.

The **Pharmacy Building**, completed in 1924, is a three-story brick structure, 62 by 123 feet, located west of Science Hall and near the Women's Gymnasium. Gray terra cotta, white cement, and iron gratings in the arcways furnish embellishment. In addition to the regular classrooms and laboratories, special features of the building include a model drug store for instructional work, a drug testing laboratory, a sign-card and window trimming department, a drug museum, a library and study room, a crude drug room for investigational work with drugs indigenous to Oregon, dark room, fireproof vault, stock rooms, and an amphitheater seating two hundred persons to be used as a scientific lecture room. The lighting, heating, and ventilating systems are all the most modern and effective.

Cauthorn Hall, one of the halls of residence for women, is a well-proportioned frame building, situated on a commanding spot in the western part of the campus. It is 50 by 160 feet, has three stories and basement, and contains sixty-two rooms. On the first floor are situated the reception rooms, dining-room, kitchen, and several student rooms. Each floor is supplied with baths, showers, hot and cold water, electric light, and steam heat. A laundry for student use is provided. The equipment and furnishings are thoroughly modern and adequate, and the hall throughout is attractive and homelike.

Margaret Snell Hall, another hall of residence for women, completed in 1921, is located north of the Home Economics Building. The building is 96 by 235 feet in size built of brick and terra cotta, three stories high above a basement. On the first floor are located the reception rooms and the dining-room and kitchens, together with a few student rooms. The laundry and freight room are located in the basement, which is connected by an elevator with a trunk-storage room on each floor. One hundred and twenty-eight rooms, most of them designed to accommodate two students, are equipped with individual closets, running water, steam heat, and electric lights. Compartment bathrooms, with showers in addition, a hair-dressing room, and a clothes-pressing room, are provided on each floor, all with thoroughly modern and sanitary equipment. The stairways are easy and convenient. On the third floor a hospital room, with three beds, is equipped with separate kitchen and bathroom, and connected with the main kitchens by a dumb waiter. Throughout the building every facility is provided in keeping with good management, health, and home comfort.

Waldo Hall, a third hall of residence for women, occupies a commanding site one hundred and fifty yards west of the Armory. It is a large building of pleasing appearance, with a concrete

foundation and basement wall, and a cream-colored, pressed-brick superstructure, three stories high. The dimensions are 96 by 240 feet; and it contains one hundred and twenty-five rooms for students. On the entrance floor are located the dining rooms and kitchens and a well-appointed laundry for students. On the first floor are spacious reception rooms and a considerable number of student rooms. The upper floors are given up entirely to student rooms. Each floor has a trunk room, baths and showers. Each room has closets, running water, steam heat, and electric light. The hall is modern in its appointments, and all equipment and furnishings necessary for health, comfort, and homelike atmosphere have been provided.

Men's Dormitory. This building, fitted up in the fall of 1919 as a campus residence for men students, is 57 by 204 feet in size, located near the Men's Gymnasium and the "Y" Hut. While the building was erected during the war for barracks, it was designed to be a permanent structure on the campus and was built with a view to being veneered with brick. It is built on a decided slope, with basement and three floors. The first floor contains a spacious living-room at the east end, and a number of student rooms at the west end. The two upper floors are given up entirely to student rooms. Lavatory, toilet, and shower-bath facilities are provided on each floor, with laundry facilities in the basement. Student rooms are finished in wood, well lighted, and conveniently arranged. Steam heat and electric lights are provided throughout the building. Rooms are arranged to accommodate from two to four students; and furnishings, such as closet space, tables, chairs, iron bedsteads, etc, are provided on this basis. For the accommodation of the students at the Men's Dormitory a cafeteria is maintained at Waldo Hall with prices as low as possible consistent with prevailing costs of supplies and service.

The Cattle Barn. The department of Animal Husbandry has a modern beef-cattle and sheep barn. It is located just west of the old barns, and has a floor space of 52 by 120 feet for sheltering stock. The hayloft has a large storage capacity for three hundred tons of hay and straw. Adjoining the barn are several concrete-floored exercise lots and a new stave silo. Especial conveniences are provided for the feeding, watering, weighing, and handling of livestock.

The Dairy Barn is a frame building with cement foundation and brick pilasters. The main part is 50 by 100 feet, two stories

high, with two wings extending to the south, each 46 by 80 feet, one story in height. There is also a milk-room, boiler room, and fuel room, as well as bins for the storage of grain and feed. The cow stables are floored with concrete and provided with modern stanchions, milking machines, and feeding facilities. Wide aisles afford convenience to students and visitors. Three silos of different types, erected adjoining the Dairy Barn, are regularly utilized in the feeding of the dairy animals. The second story has storage capacity for one hundred tons of loose hay.

The Military Stables, located just beyond the Dairy Barn, accommodate the ninety horses and mules which are used in common by the Artillery and Cavalry units. The stalls are double, with earth and wooden floors. There are two through driveways of concrete, ample storage space for forage, and farrier's supply room. Box stalls are provided for sick horses and private mounts of officers. Adjacent to the stables are the gun sheds housing the big guns and other equipment of the Artillery unit. There are also a blacksmith's shop, saddler's shop, artillery repair shop, and cavalry saddle room.

The Horse Barn. The new Horse Barn now being constructed to replace the old barn which burned in September, 1924, will probably be the most modern and most carefully planned horse barn in the state, although it is not elaborate or expensive. The main barn is 40 by 130 feet, with a wing 28 by 40 feet. It will house forty head of horses, together with a year's supply of grain, hay, and bedding. In addition to time-proven labor-saving conveniences, several new and modern labor-saving devices will be installed which will be tested out experimentally under the supervision of the Committee on Electricity in Agriculture.

Hog Barn and Feeding House. The barn is designed especially for farrowing, and contains twenty-nine pens, with a four-foot alley running the length of the building from east to west. Concrete is used for the entire floor, the feeding troughs, and the automatic watering equipment. The feeding house is 28 by 40 feet in dimensions, three stories high. The ground floor is occupied by a driveway and entrance alley, root bin, two large grain bins, which extend through the second story, and a hopper for dumping grain into the elevator, which leads to the third floor. The second story provides room for the storage of straw, six smaller grain bins with hopper bottoms, and quarters for the herdsman. The third floor contains the grinder, motor, chutes to grain bins, and storage room for movable equipment. The total capacity of the building is 15 tons of roots, 6,308 bushels of grain, and 40 tons of straw.

The Poultry Houses. On a five-acre tract of land, lying southwest of Cauthorn Hall, have been erected several buildings for the needs of the department of Poultry Husbandry. The main poultry building is a three-story structure and is used principally for class, laboratory, and demonstration purposes. Besides the main poultry building there is an incubator house, with a capacity of twenty-four incubators and complementary apparatus; and a feed-storage building and a brooding house. There are also colony houses for laying and breeding stock and growing chicks. Part of the colony houses are movable and constructed upon a plan that could be adopted by any farmer. The colony brooding coops are also portable and are used for investigations in both natural and artificial brooding.

The Heating Plant, recently completed, is located south of the Armory, 52 by 80 feet in dimensions and one story high. It is constructed of brick and concrete, with concrete tunnel and conduits leading to the various buildings of the campus. The radial chimney is 175 feet high and 10 feet in interior diameter, having an outside ladder and platforms permitting student work on temperatures of flue gases. The plant is equipped with two 500-horsepower boilers, with dual furnaces permitting the burning of either oil or the Oregon mill-refuse known as hog-fuel. The present building contains space for additional equipment, and the plant is designed to permit enlargement.

THE INCOME OF THE COLLEGE

Funds for the support of the College in its three grand divisions of work, Resident Instruction, Experiment Station, and Extension Service, are derived both from the National Government and the State of Oregon, as follows:

FOR RESIDENT INSTRUCTION

FROM THE NATIONAL GOVERNMENT

Land-Grant Interest Fund. Interest under the land-grant fund accruing under the act of Congress of 1862 approximates \$11,500 a year. No part of this fund may be used for the purchase, erection, or maintenance of any building.

The Morrill-Nelson Fund. An additional annual appropriation of \$50,000 a year is provided in the Morrill Act of 1890 and the Nelson amendment thereto of 1907, with the same limitation as to usage indicated for the land-grant interest fund.

FROM THE STATE OF OREGON

The Millage Tax. The Resident Instruction work of the College is chiefly dependent for maintenance, including buildings and betterments, upon the income from the millage tax, as provided by the State Legislature of 1913, and by vote of the people May 21, 1920. The income from this source for the fiscal year of 1924-25 is \$1,131,758.00.

From the entrance fees and non-resident tuition for the year 1923-24, Resident Instruction work derived an income of \$32,112.32 of which \$20,154.00 was from non-resident tuition.

FOR EXPERIMENT STATION

Funds for the Agricultural Experiment Station, including the main station at Corvallis and seven branch stations, each in an important agricultural section of the state, are derived from the National Government, the State of Oregon, and Oregon counties, as follows:

FROM THE NATIONAL GOVERNMENT

The Hatch Fund. Under an act of Congress, approved March 2, 1887, the College receives \$15,000 a year for the maintenance of an Agricultural Experiment Station, "to aid in acquiring and diffusing among the people useful and practical information on subjects connected with agriculture."

The Adams Fund. An act of Congress, approved March 20, 1906, provides an annual appropriation of \$15,000.

This fund is "to be applied only to paying the necessary expenses of conducting original research or experiments bearing directly on the agricultural industry" of the state, and therefore supplements the Hatch Fund in the maintenance of the Experiment Station.

For the support of the branch station at Moro the National Government expends annually about \$7,000, and for the branch station at Hermiston about \$3,300.

FROM THE STATE OF OREGON

State Funds. The State Legislature of 1925 made the following appropriations for agricultural investigations during the biennium 1925-1926. For the general work of the Experiment Station, \$50,000; for crop pest and horticultural investigations, \$30,000; for soil, drainage, and irrigation investigations, \$15,000; for dairy investigations, \$20,000; for poultry disease investigations, \$10,000, making a total of \$125,000, or \$62,500 annually.

The state also appropriates \$54,500 annually for the support of branch experiment stations at Astoria, Burns, Hermiston, Hood River, Moro, Talent, and Union.

FOR EXTENSION SERVICE

FROM THE NATIONAL GOVERNMENT

The Smith-Lever Fund. This fund was established by the Smith-Lever Agricultural Extension Act passed by Congress May 8, 1914. By its provisions the Oregon Agricultural College received \$10,000 from the Federal Government to apply towards the support of the Extension Service for the fiscal year ending June 30, 1915. This sum was increased annually for seven years. The maximum of \$41,300.38 was reached July 1, 1922, and continues as a permanent appropriation for each fiscal year, as long as an equal sum, less the basic \$10,000, is "appropriated for that year by the legislature" of the state, "or provided by state, county, college, or local authorities, or individual contributions within the state for the maintenance of the cooperative agricultural extension work provided for in this Act." In order to maintain Extension work, which expanded rapidly during the war, Congress, beginning with the fiscal year 1919-20, has appropriated annually a Supplemental Federal Smith-Lever fund. Oregon's share of this Supplemental fund for the fiscal year 1924-25 is \$9,924.51, making the total Smith-Lever funds for this year \$51,224.89.

Department of Agriculture Cooperative Funds. For the fiscal year ending June 30, 1925, the United States Department of Agriculture has given Oregon \$22,962 for Extension work in agriculture and home economics, the state duplicating this amount up to \$15,000, as shown under "Cooperative Work." In addition, the Bureau of Biological Survey of the United States Department of Agriculture has appropriated approximately \$12,000 for rodent control work during the fiscal year.

FROM THE STATE OF OREGON

For General Extension Work. The state appropriates \$25,000 a year for general extension work, including extension schools, lectures, demonstrations in agriculture and homemaking, publications, and Farmers' and Homemakers' Week. Towards meeting the Smith-Lever increase the state appropriated \$62,601 for the biennium 1925-1926.

For Cooperative Work. For cooperative work with the United States Department of Agriculture, as above mentioned, the state appropriates \$15,000 a year.

For County Extension Work. To meet the appropriations made by various counties for maintaining county extension work, including agricultural and home demonstration agent work, the state is now appropriating approximately \$50,800 a year.

For Rodent Control. For the rodent control work carried on in cooperation with the Biological Survey of the United States Department of Agriculture the state appropriated \$5,000 for the biennium 1925-1926.

OFFICIAL PUBLICATIONS

The College Bulletin. This publication includes the Reports of the Board of Regents, the general College Catalogue, special announcements of College courses of study, illustrated booklets depicting College activities of special interest or timeliness, announcements of the Summer Session, announcements of the Winter Short Courses, and circulars to prospective students.

Extension Bulletins. These bulletins consist of monographs on the various phases of Agriculture, Household Science and Household Art, Engineering, Mining, and Commerce, together with bulletins and circulars issued in connection with the Club work for boys and girls in the public schools and the Home Co-operative Demonstration Projects. These bulletins are written in such style as to be easily understood, thus meeting the popular demand for scientific knowledge and giving it in such form that the people of the state may profit by its application to the problems of every-day life.

Experiment Station Publications. The Station Bulletins include reports upon research problems and upon experimental investigations in agronomy, horticulture, drainage and irrigation, dairying, animal husbandry, poultry husbandry, insect pests, plant diseases, home economics, and special subjects of interest to the husbandman, conducted at the home station or the several branch stations. The Experiment Station also issues a series of circulars briefer and less technical than the bulletin series.

STUDENT PUBLICATIONS

The Barometer. In March, 1896, the literary societies of the College began the publication of a monthly periodical, the "O. A. C. Barometer." The enterprise met with deserved success, and "the organ of the student body" is now issued as a four-page, seven-column daily. It publishes the news of the College, and is of general public importance as representing the interests, character, and

accomplishments of the student body at the College. By action of the Board of Regents, resulting from a unanimous recommendation of the student body, a portion of the regular term student fee of \$5.50 is devoted to the "Barometer," and every student regularly receives the paper.

The Beaver. The annual publication of the junior class made its initial appearance as "The Orange" in 1907. It is a high-class publication, substantially bound, and fully illustrated with photo-engravings, pen-and-ink sketches, and line and wash drawings. It is a full-dress carnival of the year's life, representing the dignity, the beauty, the versatility, the gaiety, the traditions, the sentiment, and the solidarity of the Oregon Agricultural College.

The Oregon Countryman. This is an illustrated monthly magazine, published by the students in Agriculture and Home Economics under the supervision of the faculties of these schools. It is designed to be of special service to the farm home. Besides dealing in a practical manner with the various College departments, it contains articles of scientific value contributed by the Experiment Station workers. Successful men and women of the state contribute articles for each issue.

The Oregon State Technical Record. This is a semi-annual magazine devoted to engineering and mechanic arts. Its purposes are to record engineering progress in the Northwest; to furnish news; to publish records of scientific work done by students in this institution; and to publish any matter of special technical and scientific interest to civil, mining, mechanical, and electrical engineers, and foresters and others engaged in technical pursuits.

The O. A. C. Directory, a magazine published twice a year by the students of the School of Commerce under the supervision of the faculty of the School, is devoted to the commercial interests of the College and the state. Articles of merit are contributed by students, faculty, and prominent business men of the state. A feature is the publication each year of a complete directory of all the members of the institution, students, faculty, and employees.

The O. A. C. Alumnus. This is a monthly periodical edited and issued for the Alumni Association by the Secretary of the General Alumni Association of the Oregon Agricultural College, whose office is at the College.

The Orange Owl. This publication, issued quarterly during the college year, is designed to promote creative talent among students in the expression of wit, humor, verse, prose fancy, whim-

sical essay, pen sketch, and cartoon. The initial publication appeared during the spring of 1920.

The Annual Cruise is an illustrated magazine published by the Forest Club. Its objects are more closely to unite the forestry and lumbering interests of the Pacific Northwest, to advance scientific forestry and lumbering, and to promote forest interests in every feasible way. Articles of technical value are contributed by members of the faculty and by graduates, experts in their respective fields of effort.

STUDENT ORGANIZATIONS

One of the most important factors in rounding out the results and benefits of a college course is the society, club, or association work. As a result of the diverse interests of college life and the varied tastes of the students, the following organizations, besides many others, are maintained by students and faculty.

GENERAL ORGANIZATIONS

The Associated Students. This is an organization of the entire student body working under a constitution and by-laws approved by the faculty and having general authority over all student body enterprises. Officers are elected annually, nominations and elections being conducted in a manner similar to that of the state electorate. The officers consist of a president and a secretary chosen from the senior class, and three vice-presidents, chosen one each from senior, junior, and sophomore classes. These five officers, as a whole, constitute the executive committee of the student body and have general supervision of all affairs of interest to the student body.

The Board of Control. The Board of Control consists of three faculty members appointed by the President of the College, one alumnus chosen by the Alumni Association, and five students who are the executive committee of the student body. The student body constitution vests in this Board of Control authority to supervise all student body interests entailing the expenditure of student body funds. They exercise functions in the main by the approval of budgets and schedules. The immediate supervision is exercised through a general manager appointed by the Board of Control.

Student Self-Government. Student self-government at the College places the general disciplinary powers of the institution in the hands of the students. The Student Council, an organization

made up of ten students, five of whom are seniors, three juniors, and two sophomores, has been created and vested with such powers as are necessary to enforce the rules and regulations adopted by the students. Three members of the Student Council hold that position by virtue of their office as president of each of the classes. The remaining members are elected annually by the student body.

The Greater O. A. C. Association. This Association, which includes the whole student body of the College, was organized in 1918 to promote the welfare of the state and the College by fostering a finer college spirit and a keener interest in higher education throughout the state. The students from each county in the state constitute a separate sub-organization with a chairman and other officers who work directly under the leadership of the Greater O. A. C. Executive Committee, composed of three students chosen by the student body at the regular election in the spring. The Association cooperates with the Alumni Association in work for a greater and better O. A. C.

The Associated Women Students, organized in 1916, includes all the young women of the student body. In the fall of 1919 it became a member of the Oregon Federation of Women's Clubs. The purpose of the organization is to develop unity among the women of the campus and to promote the spirit of democracy. With the approval of the Dean of Women, who is vitally interested in all phases of the activities of the organization, the young women determine the general regulations governing women students.

The Varsity O Association. This association includes all men of the College who have been officially awarded the Orange O in recognition of service on the intercollegiate athletic teams of the College. The function of the Varsity O Association is to promote the athletic ideals of the College and to serve in an advisory capacity to the Athletic Board of Control.

The Cosmopolitan Club. This organization of foreign and American students, installed in 1911, is the local chapter of the Association of Cosmopolitan Clubs of the World. Its purpose is to provide social and educational advantages for its members and to promote international friendship. At present nineteen countries are represented in the local chapter.

CHRISTIAN ASSOCIATIONS

Both the Young Men's and the Young Women's Christian Associations occupy a vital place in the life of the College community. Each association has a full-time general secretary on the campus.

The Young Men's Christian Association is a campus Christian movement of students and faculty for the following purposes: (1) to lead students to faith in God through Jesus Christ; (2) to lead students into membership and service in the Christian church; (3) to promote their growth in Christian faith and character, especially through the study of the Bible; (4) to promote a positive moral and religious college spirit and a fellowship of service and good-will on the campus; (5) to challenge students to devote themselves in united effort with all Christians to make the will of Christ effective in human society and to extend the Kingdom of God throughout the world. The local association was organized in 1890. The large and varied program of activities, built around the Christian idea, includes cooperation with the churches; Bible classes and discussion groups; securing of speakers with positive Christian messages; promotion of the Northwest College Students' Conference at Seabeck on Puget Sound; hundreds of student interviews with the secretaries; employment bureau; securing part-time work valued at \$30,000 to \$50,000 each year; assistance in securing rooms and board; approved motion-pictures at cost; special work with new students; wholesome social activities; sick visitation; work with foreign students; cooperation with the Student Volunteer Band and the Fellowship for Life Service. The association fills a unique place in campus life as a unifying and vitalizing spiritual force.

The Young Women's Christian Association aims to cooperate with all forces of the College and of the community in promoting among the women students a well-developed life. The General Secretary is at the service of all of the women of the campus, at the Association headquarters in Shepard Hall. On registration days young women of the Y. W. C. A. meet the incoming students and assist them in adjusting their work. The meetings of the Association are held the first and third Thursday of every month. All women are cordially welcome to these meetings. Bible, mission, and industrial study classes, community service, parties, and teas form part of the year's program. More than one-half of the women in the College are members of the Y. W. C. A.

FORENSIC AND DRAMATIC ORGANIZATIONS

O. A. C. Forensic Association. This is a new organization with the purpose of bringing together for cooperative activity all campus organizations and individuals interested in any phase of forensics. This society through its members has charge of all business pertaining to competitive work in oratory and debate and cooperates in the promotion of forensics and dramatics at the College.

Intercollegiate Debate and Oratory. Each year the Oregon Agricultural College has three intercollegiate debates, putting into the field six teams, three supporting the negative and three the affirmative of the same question. The College sends one representative each year into the old-line State Oratorical Contest in which eight colleges take part, and a representative to an interstate contest in which seven colleges of the West participate (Stanford, Whitman, Washington State, Puget Sound, Pacific University, Montana, and Oregon Agricultural College). Monogrammed sweaters and medals are awarded to the men and women who represent the College in these events.

Local Debate and Oratory. There are interclass and interfraternity contests in debate, oratory, and extempore speaking, those in extempore speaking being carried on in connection with the classes in public speaking. A money prize is given for the best extempore speaking by a student in these contests. In the annual interclass forensic-athletic championship contest two representatives from each class participate. The winner represents the College in the state contest.

National Collegiate Players. Mask and Dagger Chapter of this national society gives students training in dramatic art. A try-out is held at the beginning of the college year in which all students except freshman men may participate. If elected by the club's judges they become eligible to try out for college plays. Successful participation in a college production entitles them to active membership in the club. No student, however, will be permitted to take part in a public production who has not an average for all his College work, at the time the play is being prepared, of at least 75 percent. Platform exhibitions are given and standard plays presented during the college year.

Literary Societies. The Shakopean Literary Society, organized in 1918, is open to men and women of the student body, with a membership limit of thirty-five. The purpose of the organization is encouragement of public speaking. Features of the meetings are debating, oratorical contests, and discussion of current topics. The Lincolnian Literary Society, organized in 1921, fills a similar field.

The Lyceum Club, organized in 1922, prepares students to give musical programs, lectures, and full evenings of readings. Programs are presented in towns of the state. Election to membership depends upon recommendation of the School of Music and the department of Public Speaking and Dramatics.

MUSICAL ORGANIZATIONS

Musical organizations at the College, including the R. O. T. C. Band, the Orchestras, the Glee Club, the Madrigal Club, and the Mandolin and Guitar Club, are directed and coached by members of the faculty of the School of Music. These organizations contribute vitally to the life of the institution and constitute a popular and valuable field of activity for students with musical interest and talent. Details concerning musical organizations are given in the section of the Catalogue devoted to the School of Music.

TECHNICAL AND PROFESSIONAL CLUBS

A number of clubs and associations in the various technical schools and departments have as their object the advancement of interest and information in the respective technical fields. Further details concerning some of these clubs are given under the respective schools. Among the technical and professional clubs are the Agricultural Club, Horticultural Club, Withycombe (Animal Husbandry) Club, Farm Management Club, Dairy Club, Soils Improvement Club, Oregon Agricultural College Chamber of Commerce, Civil Engineering Club, Electrical Engineers, American Association of Engineers (O. A. C. chapter), Forest Club, Chemical Engineering Society, Home Economics Club, Miners Club, Pharmaceutical Association, R. O. T. C. Association, and Society of Military Engineers.

HONOR SOCIETIES

Various societies having as their chief purpose the promotion and recognition of scholarship elect annually from among the student body limited numbers of those who have shown superior scholastic attainment, qualities of leadership, and personal character. The fact that most of these societies are national in scope, with chapters in the leading colleges and universities and with uniformly high standards for membership, makes election to one of the honor societies a distinction greatly prized. The following list includes the honor societies at present represented at the Oregon Agricultural College.

- Alpha Kappa Psi (Commerce, men, O. A. C. chapter established 1914).
- Alpha Zeta (Agriculture, men, O. A. C. chapter established 1918).
- Beta Alpha Psi (Accounting, men, O. A. C. chapter established 1922).
- Chi Epsilon (Chemical Engineering, established 1918).
- Delta Psi Kappa (Physical Education, women, O. A. C. chapter established 1920).
- Delta Sigma Rho (Forensic, men, O. A. C. chapter established 1922).
- Eta Kappa Nu (Electrical Engineering, O. A. C. chapter established 1921).
- Euterpe (Music, women, established 1920).
- Gamma Sigma Delta (Agriculture, O. A. C. chapter established 1909).

- Kappa Kappa Psi (Band, O. A. C. chapter established 1923).
Kappa Phi Delta (Local, Education, men, established 1924).
Lambda Epsilon (Local, Education, women, established 1925).
Omicron Nu (Home Economics, O. A. C. chapter established 1919).
Phi Epsilon Delta (National Collegiate Players) (Dramatic, men and women,
Mask and Dagger Chapter established 1923).
Phi Chi Theta (Commerce, women, O. A. C. chapter established 1920).
Phi Kappa Phi (National scholarship, men and women, O. A. C. chapter
established 1924).
Rho Chi (Pharmacy, men and women, O. A. C. chapter established 1919).
Scabbard and Blade (Military, O. A. C. chapter established 1920).
Scribe (Local, journalistic, women, established 1921).
Sigma Alpha (Local, Physical Education, men, established 1925).
Sigma Delta Chi (Journalistic, men, O. A. C. chapter established 1920).
Sigma Tau (Engineering, O. A. C. chapter established 1913).
Tau Beta Pi (Engineering, O. A. C. chapter established 1924).
Xi Sigma Pi (Forestry, O. A. C. chapter established 1921).
Zeta Kappa Psi (Forensic, women, O. A. C. chapter established 1921).

School of Agriculture

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
ARTHUR BURTON CORDLEY, D.Sc., Dean of the School of Agriculture.
JANIE STILES, Secretary to the Dean.

Agricultural Engineering

WILLIAM JAMES GILMORE, B.S., Professor of Agricultural Engineering.
ANTON EVERETT JENSEN, Instructor in Agricultural Engineering.

Animal Husbandry

ERMINE LAWRENCE POTTER, M.S., Professor of Animal Husbandry.
ORAN MILTON NELSON, B.S., Professor of Animal Husbandry.
BENJAMIN WILLIAM RODENWOLD, B.S., Assistant Professor of Animal Husbandry.
ALFRED WEAVER OLIVER, B.S., Assistant Professor of Animal Husbandry.

Dairy Husbandry

PHILIP MARTIN BRANDT, B.S., A.M., Professor of Dairy Husbandry.
VINCENT CHAPPELL, M.S., Associate Professor of Dairy Manufactures.
ROY CARROLL JONES, B.S., Associate Professor of Dairy Production.
HOWARD NOTSON COLMAN, A.B., B.S., Instructor in Dairy Husbandry.
ELMER EDWARD ANDERSON, B.S., Instructor in Dairy Husbandry.

Farm Crops

GEORGE ROBERT HYSLOP, B.S., Professor of Farm Crops.
EARL NORMAN BRESSMAN, B.S., Associate Professor of Farm Crops.
CHARLES CURTIS RUTH, M.S., Assistant Professor of Farm Crops.
HARRY AUGUST SCHOTH, B.S., Instructor in Farm Crops.
BERTHA COURTRIGHT HITE, Seed Analyst (Bureau of Plant Industry, United States Department of Agriculture, cooperating).
HARRY HARRISON GARDNER, B.S., Teaching Fellow in Farm Crops.

Farm Management

HENRY DESBOROUGH SCUDDER, B.S., Professor of Farm Management.
CLAIR WILKES, B.S., Instructor in Farm Management.

Horticulture

WALTER SHELDON BROWN, A.B., M.S., Professor of Horticulture.
 EDWARD MARIS HARVEY, Ph.D., Professor of Research in Horticulture.
 ARTHUR LEE PECK, B.S., B.A., Professor of Landscape Gardening and
 Floriculture; Superintendent of Campus and Greenhouses.
 ARTHUR GEORGE BOUQUET, B.S., Professor of Vegetable Gardening.
 ERNEST HERMAN WIEGAND, B.S., Professor of Horticultural Products.
 HENRY HARTMAN, M.S., Associate Professor of Pomology.
 CARL EPHRIAM SCHUSTER, M.S., Associate Professor of Pomology.
 *ANDREW EDWARD MURNEEK, M.S., Assistant Professor of Horticultural
 Research.
 LYLE PORTER WILCOX, B.S., Instructor in Horticulture.
 JAMES CARSCALLEN BELL, M.S., Instructor in Horticulture.
 JOHNSON ANDREW NEFF, B.S., Teaching Fellow in Horticulture.
 LOUIS ARROWOOD FLETCHER, B.S., Teaching Fellow in Pomology.
 OLIVER HAM, Assistant in Vegetable Gardening.

Poultry Husbandry

ALFRED GUNN LUNN, B.S., Professor of Poultry Husbandry.
 FRANK ELMER FOX, B.S., Assistant Professor of Poultry Husbandry.
 HERBERT VON LEHE, Assistant in Poultry Husbandry.

Soils

WILBUR LOUIS POWERS, M.S., Professor of Soils.
 CHARLES VLADIS RUZEK, B.S., Professor of Soil Fertility.
 EDWARD FRITCHOFF TORGERSON, B.S., Assistant Professor of Soils.
 *WILLIAM WATERS JOHNSTON, B.S., Assistant Professor of Soils.
 ROSCOE ELMO STEPHENSON, Ph.D., Assistant Professor of Soils.
 VILAS DEVALD YOUNG, B.S., Teaching Fellow in Soils.
 WILLIAM MORGAN HIGBY, B.S., Teaching Fellow in Soils.

Veterinary Medicine

BENNETT THOMAS SIMMS, D.V.M., Professor of Veterinary Medicine.
 FRED MILLER, D.V.M., M.S., Assistant Professor of Veterinary Medi-
 cine.
 CHARLES RUMPEL DONHAM, D.V.M., Instructor in Veterinary Medicine.

Curricula. The School of Agriculture offers a four-year curriculum leading to the degree of Bachelor of Science; a special four-year baccalaureate curriculum in Landscape Gardening; a special four-year baccalaureate curriculum in Horticultural Products; and graduate curricula leading to the degree of Master of Science.

* On leave of absence.

The Baccalaureate Degree. The aim of the work in Agriculture is to train young men to become successful farmers, dairymen, stockmen, poultrymen, and fruit growers; to equip them to become efficient managers of orchard and ranch properties and of agricultural cooperative organizations; to prepare them to become specialists in the service of the United States Department of Agriculture, or in some branch of technical work in agricultural colleges, experiment stations, or extension services; or to prepare them for service as teachers of Smith-Hughes agriculture in the public high schools.

Requirements for Graduation. The completion of 207 college credits by men and 192 by women is required for graduation. Work the first two years is prescribed, except that a three-credit option is allowed two terms of the sophomore year. During the junior and senior years, opportunity is offered for specialization in Agricultural Bacteriology, Agricultural Chemistry, Agricultural Education, Animal Husbandry, Botany and Plant Pathology, Dairy Husbandry, Entomology, Farm Crops, Farm Management, Horticulture (Horticultural Products, Landscape Gardening, Pomology, Vegetable Gardening), Marketing of Agricultural Products, Poultry Husbandry, Soils, Zoology, or General Agriculture. A suggested curriculum for women is outlined. Of the 102 junior and senior credits necessary for graduation, 34 are prescribed and 68 are electives.

In addition to the prescribed work of the first two years each candidate for graduation must have completed:

(a) Eighteen or more credits in one of the above-named subjects, as selected at the beginning of the junior year. These courses, together with the correlated subjects in other departments, must be selected with the advice and consent of the head of the department and the approval of the Dean.

(b) At least fifty-four additional credits from any of the courses given in the School of Agriculture.

(c) Not less than twenty-four credits from among such subjects as English, Public Speaking, Economics, Sociology, Political Science, and Finance and Administration (of which 12 credits are prescribed, see page 37), or in Industrial Journalism, Psychology, Education, Modern Languages, Mathematics, or Military Science and Tactics.*

Graduate Work. Opportunities are provided in each of the departments of the School of Agriculture for graduates of this College, or of other institutions of equal rank, to do graduate work leading to the degree of Master of Science. The requirements for

* Twelve credits in Military Science and Tactics are required for graduation. Of these, six credits each year are taken in the freshman and sophomore years. The Advanced R. O. T. C. Course is elective and comprises eighteen additional credits (nine in the junior year and nine in the senior year) all of which may be applied as electives for graduation from any school in the College.

this degree are explained in full on page 38. For information concerning the graduate curriculum in Agricultural Economics and Rural Sociology, see the School of Commerce section of the catalogue.

CURRICULA IN AGRICULTURE

(B.S. Degree)

Freshman Year*

Section I

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
General Botany (Bot 101, 102)	4	4	---
Principles of Zoology (ZP 130)	---	---	5
Library Practice (Lib 100)	---	---	1
Crop Production (FC 100)	5	---	---
Elements of Horticulture (Hrt 100)	---	5	---
Stock Judging I (AH 111)	---	---	3
¹ Gymnastics and Calisthenics (PEM 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
² Military Science and Tactics	2	2	2
	$17\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$

Section II

English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
General Botany (Bot 101, 102)	---	4	4
Principles of Zoology (ZP 130)	5	---	---
Library Practice (Lib 100)	1	---	---
Crop Production (FC 100)	---	5	---
Elements of Horticulture (Hrt 100)	---	---	5
Stock Judging I (AH 111)	3	---	---
¹ Gymnastics and Calisthenics (PEM 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
² Military Science and Tactics	2	2	2
	$17\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$

Section III

English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
General Botany (Bot 101, 102)	4	---	4
Principles of Zoology (ZP 130)	---	5	---
Library Practice (Lib 100)	---	1	---
Crop Production (FC 100)	---	---	5
Elements of Horticulture (Hrt 100)	5	---	---
Stock Judging I (AH 111)	---	3	---
¹ Gymnastics and Calisthenics (PEM 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
² Military Science and Tactics	2	2	2
	$17\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$

*The freshman and sophomore work for students in Horticultural Products is outlined on page 90; for students in Landscape Gardening, on pages 91-92; the work recommended for women is presented on page 97. Students who expect to specialize in one of the sciences basic to Agriculture (Bacteriology, Botany, Chemistry, Entomology, or Zoology) should consult with the head of the respective department before registering.

¹Women carry PEW 111, 112, 113, 121, 122.

²Students have the option of entering the infantry unit or the cavalry unit.

Sophomore Year*

Section I

	Term		
	1st	2d	3d
Quantitative (Ch 247), Organic (Ch 224), Agricultural Chemistry (Ch 251).....	5	5	5
Soils (Sls 201, 202), Soil Drainage and Irrigation (Sls 203).....	3	3	3
General Bacteriology (Bac 201).....	4	.....	.....
Livestock Management (AH 221).....	.....	4	.....
Elements of Dairying (DH 200).....	.....	.....	4
Principles of Economic Entomology (Ent 201).....	3	.....	.....
¹ Optional.....	.....	3	3
Gymnastics and Calisthenics (PEm 211, 212, 213).....	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Section II

Quantitative (Ch 247), Organic (Ch 224), Agricultural Chemistry (Ch 251).....	5	5	5
Soils (Sls 201, 202), Soil Drainage and Irrigation (Sls 203).....	3	3	3
Elements of Dairying (DH 200).....	4	.....	.....
General Bacteriology (Bac 201).....	.....	4	.....
Livestock Management (AH 221).....	.....	.....	4
Principles of Economic Entomology (Ent 201).....	.....	3	.....
¹ Optional.....	3	.....	3
Gymnastics and Calisthenics (PEm 211, 212, 213).....	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Section III

Quantitative (Ch 247), Organic (Ch 224), Agricultural Chemistry (Ch 251).....	5	5	5
Soils (Sls 201, 202), Soil Drainage and Irrigation (Sls 203).....	3	3	3
General Bacteriology (Bac 201).....	.....	.....	4
Livestock Management (AH 221).....	4	.....	.....
Elements of Dairying (DH 200).....	.....	4	.....
Principles of Economic Entomology (Ent 201).....	.....	.....	3
¹ Optional.....	3	3	.....
Gymnastics and Calisthenics (PEm 211, 212, 213).....	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Sophomore Options†

Advanced Testing (DH 204).....	.....	.....	3
Dairy Breed Types (DH 351).....	.....	.....	3
Breeds of Livestock I, II (AH 231, 232).....	3	3	.....
Farm Motors (AE 111) or other electives in Ag'l Engineering....	3	3	3
Landscape Gardening (Hrt 231).....	3	.....	.....
Practical Poultry Keeping (PH 201).....	3 or	3 or	3
² Plant Propagation and Greenhouse Practice (Hrt 241).....	.....	3	.....
Vegetable Growing (Hrt 221).....	.....	.....	3
³ General Physics (Ph 201, 202).....	3	3	.....
General Geology (G 301c).....	.....	.....	3
Commercial Geography (ES 101).....	4 or	4 or	4
Economic Geography (ES 308).....	.....	3 or	3
Economic History of the United States (ES 201).....	3	.....	.....

*Students who expect to specialize in Marketing and Agricultural Economics should see the Dean of Agriculture before registering.

†No sophomore optional course will be given to fewer than five students.

¹Sophomore students are expected to choose options from sophomore list of optional courses as given on this page.

²Offered also as a junior elective.

³Required of students who do not present credit for at least one year's work in high school Physics.

Junior Year

	Term		
	1st	2d	3d
Farm Accounting (FA 361).....		3	---
Farm Management (FMg 302).....		4	---
Agricultural Economics (ES 362).....			3
Genetics (ZP 351).....	3	---	---
Animal Nutrition (AH 351).....			4
Comparative Anatomy (VM 301), or an elective.....	3	---	---
Principles of Plant Pathology (Bot 311).....	4	---	---
² or Comparative Anatomy (VM 302), 3 credits			4
Plant Physiology (Bot 321).....			4
² or Comparative Physiology (VM 321), 3 credits			4
Electives	7	10	6
	17	17	17

Senior Year

Practical Public Speaking I (PSP 254).....	3	---	---
National Government (PS 301).....	3	---	---
Electives	11	17	17
	17	17	17

While students, during the junior and senior years, may choose their electives from a wide range of courses, subject only to the restrictions imposed by paragraphs (a) (b) (c), page 80, they are strongly urged to elect one of the following curricula.

AGRICULTURAL BACTERIOLOGY

Junior Year

	Term		
	1st	2d	3d
Farm Accounting (FA 361).....	3	---	---
Farm Management (FMg 302).....		4	---
Agricultural Economics (ES 362).....			3
Genetics (ZP 351).....	3	---	---
Physiological Chemistry (Ch 462).....			3
Bacteriology	5	5	5
Electives	6	8	6
	17	17	17

Recommended Elective

French or German.....		3	3
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Senior Year

National Government (PS 301).....	3	---	---
Practical Public Speaking I (PSP 254).....		3	---
French or German.....	3	3	3
Physical Chemistry (Ch 381, 382, 383).....	3	3	3
Bacteriology	5	5	5
Electives	3	3	6
	17	17	17

Recommended Electives

Seminar (481, 482, 483).....	1	1	1
Animal Parasites (ZP 362).....		3	---
Differential (Mth 251), and Integral Calculus (Mth 252, 253).....	4	4	4
General Physics (Ph 121, 122, 123).....	4	4	4

¹If this course is elected, one credit should be added to electives.

AGRICULTURAL CHEMISTRY

Junior Year

	Term		
	1st	2d	3d
Agricultural Economics (ES 362).....	3	.....	.....
Principles of Accounting I (FA 101).....	.....	3	.....
Public Speaking I (PSP 254).....	.....	.....	3
Organic Chemistry (Ch 227).....	.....	5	.....
Physiological Chemistry (Ch 462).....	.....	.....	3
Plant Bio-chemistry (Ch 354, 355, 356).....	3	3	3
Elementary French (ML 111, 112, 113) or Elementary German (ML 131, 132, 133).....	3	3	3
National Government (PS 301).....	3	.....	.....
¹ Electives	5	3	5
	17	17	17

Senior Year

Physical Chemistry (Ch 381, 382, 383).....	3	3	3
Intermediate French (ML 211, 212, 213) or Intermediate Ger- man (ML 231, 232, 233).....	3	3	3
Advanced English Composition (Eng 201).....	3	.....	.....
Zymology (Bac 212).....	.....	3	.....
Milk Production (DH 453).....	.....	.....	3
Agricultural Analysis (Ch 351, 352, 353) (or equivalent).....	3	3	3
¹ Electives	5	5	5
	17	17	17

AGRICULTURAL EDUCATION*

Junior Year

Farm Accounting (FA 361).....	.....	3	.....
Farm Management (FMg 302).....	.....	4	.....
Agricultural Economics (ES 362).....	.....	.....	3
Genetics (ZP 351).....	3	.....	.....
Principles of Plant Pathology (Bot 311).....	4	.....	.....
Plant Physiology (Bot 321).....	.....	.....	4
Animal Nutrition (AH 351).....	.....	.....	4
Practical Poultry Keeping (PH 201).....	3	.....	.....
Elementary Psychology (Psy 301) or Vocational Psychology (Psy 312).....	3	.....	.....
Principles of Teaching (Ed 311).....	.....	3	.....
Vocational Education (AEd 323).....	.....	3	.....
Electives	4	4	6
	17	17	17

Recommended Electives

Dairy Herd Management (DH 352).....	.....	3	.....
Forage Crops and Root Crops (FC 331).....	.....	.....	3
Practical Pomology (Hrt 311).....	4	.....	.....
Farm Motors (AE 111).....	.....	.....	3

¹Consult with head of department.

*Students may qualify for Smith-Hughes teaching by following this curriculum or by taking their major work in any other department, provided 23 units in Education are taken. For electives in Education see School of Vocational Education section of the Catalogue. Students must consult with head of the department before electing this curriculum.

Senior Year

	Term		
	1st	2d	3d
National Government (PS 301).....	3	.....	.....
Practical Public Speaking I (PSp 254).....	3	.....	.....
Secondary Education in Agriculture (AEd 411).....	(5)	or 5	.....
Supervised Teaching of Secondary Agriculture (AEd 412).....	.....	.....	3
Farm Shop I, II (AE 321, 322).....	3	.....	3
Diseases of Livestock (VM 341).....	4	.....	.....
Electives.....	4	12	11
	17	17	17

Recommended Electives

Landscape Gardening (Hrt 231).....	3	.....	.....
Pruning and Spraying (Hrt 313).....	.....	5	.....
Small Fruits and Grapes (Hrt 415).....	.....	4	.....
Poultry Breeding, Breeds, and Judging (PH 311).....	4	.....	.....
Potato Growing (FC 314).....	.....	2	.....
Soil Fertility (Sls 424).....	.....	5	.....
Elementary Industrial Journalism (IJ 200).....	.....	.....	3
Rural Sociology (ES 464).....	.....	.....	3
Cooperation (ES 323).....	.....	.....	4

ANIMAL HUSBANDRY

Junior Year

Animal Nutrition (AH 351).....	4	.....	.....
Feeds and Feeding (AH 352).....	.....	5	.....
Agricultural Economics (ES 362).....	.....	.....	3
Farm Accounting (FA 361).....	.....	3	.....
Farm Management (FMg 302).....	4	.....	.....
Genetics (ZP 351).....	3	.....	.....
Comparative Anatomy (VM 301, 302).....	3	3	.....
Comparative Physiology (VM 321).....	.....	.....	3
Electives.....	3	6	11
	17	17	17

Recommended Electives

Breeds of Livestock I (AH 231).....	3	.....	.....
Breeds of Livestock II (AH 232).....	.....	3	.....
Stock Judging II (AH 311).....	.....	.....	3
Stock Judging III (AH 411).....	4	.....	.....
Forage Crops and Root Crops (FC 331).....	.....	.....	3

Senior Year

Practical Public Speaking I (PSp 254).....	3	.....	.....
National Government (PS 301).....	3	.....	.....
Diseases of Livestock (VM 441, 442, 443).....	3	3	3
Livestock Economics (AH 661).....	.....	.....	3
Electives.....	8	14	11
	17	17	17

Recommended Electives

Stock Judging III (AH 411).....	4	.....	.....
Livestock Practice (AH 421, 422).....	1	.....	2
Meats (AH 471).....	.....	2	.....
Pedigree Study (AH 645).....	.....	2	.....
Business and Rural Law (PS 163).....	.....	.....	3
State and Local Government (PS 302).....	.....	3	.....
Soil Physics (Sls 421).....	5	.....	.....
Land Drainage (Sls 318).....	.....	.....	3
Advanced English Composition (Eng 201).....	.....	3	.....

BOTANY AND PLANT PATHOLOGY*

Junior Year

	Term		
	1st	2d	3d
Comparative Morphology and Evolution of Plants (Bot 441).....	4	.....	.....
Principles of Plant Pathology (Bot 311).....	4	.....	.....
Plant Physiology (Bot 321).....	.....	.....	4
Range and Pasture Botany (Bot 341).....	.....	3	.....
Plant Identification (Bot 203).....	.....	.....	3
Finance and Administration (elective).....	.....	3	.....
Political Science (elective).....	.....	3	.....
General Geology (G 301b).....	.....	.....	3
Genetics (ZP 351).....	3	.....	.....
Electives	6	8	7
	17	17	17

Recommended Electives

German or French.....	3	3	3
Plant Materials (Hrt 331, 332, 333).....	3	3	3
Plant Propagation and Greenhouse Practice (Hrt 241).....	.....	3	.....
Forest Pathology (Bot 314).....	.....	3	.....
Fruit Diseases (Bot 312).....	.....	.....	3
Diseases of Field Crops and Vegetables (Bot 313).....	.....	3	.....
General Physics (Ph 101, 102).....	3	3	.....
Advanced Economic Entomology (Ent 404).....	3	.....	.....
Advanced Agricultural Bacteriology (Bac 413).....	.....	.....	3
Chemistry of Spray Materials (Ch 352).....	.....	3	.....

Senior Year

Economics and Sociology (elective).....	3	.....	.....
Practical Public Speaking I (PSP 254).....	3	.....	.....
Elementary Industrial Journalism (IJ 200).....	.....	3	.....
Plant Histology (Bot 443).....	.....	3	.....
Study of Fungi (Bot 414).....	.....	4	.....
Plant Ecology (Bot 442).....	.....	.....	3
Seminar (Bot 481, 482, 483).....	1	1	1
Electives	10	6	13
	17	17	17

Recommended Electives

German or French.....	3	3	3
Physiological Chemistry (Ch 461).....	.....	3	.....
Range and Pasture Botany (Bot 341).....	.....	3	.....
Plant Pathological Technique (Bot 415).....	.....	.....	3
Advanced Botanical Studies (any term) (Bot 451, 452, 453).....	To be arranged	.....	.....
Evolution and Eugenics (ZP 352).....	.....	3	.....
Application of Plant Science in Secondary School Teaching (Bot 471).....	.....	.....	3
Historical Geology (G 302).....	.....	3	.....
Introductory Photography (Ph 361).....	3	.....	.....
College Mathematics (Mth 201, 202, 203).....	3	3	3
Investigative Work for Seniors in Horticulture (Hrt 491, 492, 493).....	3	3	3

*Students majoring in this department are not required to take in the first two years the following courses required for others: AH 111, 221; DH 200.

DAIRY HUSBANDRY

Junior Year

	Term		
	1st	2d	3d
Animal Nutrition (AH 351).....	4	---	---
Farm Accounting (FA 361).....	---	3	---
Farm Management (FMg 302).....	---	4	---
Agricultural Economics (ES 362).....	---	---	3
Genetics (ZP 351).....	3	---	---
Comparative Anatomy I, II (VM 301, 302).....	3	3	---
Comparative Physiology (VM 321).....	---	---	3
Electives	7	7	11
	17	17	17

Recommended Electives

Advanced Testing (DH 204) (if not previously taken).....	3	---	---
Commercial Buttermaking (DH 302, 303).....	3	3	---
Dairy Bacteriology (Bac 311).....	4	---	---
Dairy Chemistry (Ch 351b).....	---	3	---
Dairy Herd Management (DH 352).....	---	3	---
Dairy Breed Types (DH 351).....	---	---	3
Dairy Products Judging (DH 304).....	---	---	1
Vocational Psychology (Psy 312) or Elementary Psychology (Psy 301)	3	---	---
Principles of Teaching (Ed 311).....	---	3	---
Vocational Education (Ed 323).....	---	---	2
Market Milk (DH 301).....	---	---	3

Senior Year

Practical Public Speaking I (PSP 254).....	3	---	---
National Government (PS 301).....	3	---	3
Milk Production (DH 453).....	---	---	3
Electives	11	17	14
	17	17	17

Recommended Electives

Breeding Dairy Cattle (DH 452).....	---	3	---
Cheese Making (DH 401).....	---	4	---
Dairy Breed Types (Advanced) (DH 451) or Dairy Products Judging Team (DH 454).....	2	---	---
Diseases of Livestock (VM 441, 442, 443).....	3	3	3
Factory Organization and Management (DH 403).....	4	---	---
Forage Crops and Root Crops (FC 331).....	---	---	3
Ice-cream and Condensed Milk (DH 402).....	---	---	3
Seminar (DH 481, 482, 483).....	1	1	1
Special Studies (DH 490, 491, 492).....	To be arranged	---	---
Elementary Industrial Journalism (IJ 200).....	---	---	3
Secondary Education in Agriculture (AEd 401).....	5 or	5	---
Supervised Teaching of Secondary Agriculture (AEd 412).....	---	---	3
Range and Pasture Botany (Bot 341).....	---	3	---

ENTOMOLOGY*

Junior Year

	Term		
	1st	2d	3d
Finance and Administration (elective).....	---	3	---
Economics or Sociology (elective).....	---	3	---
Principles of Plant Pathology (Bot 311).....	4	---	---
Plant Physiology (Bot 321).....	---	---	4
Genetics (ZP 351).....	3	---	---
Advanced Economic Entomology (Ent 404).....	3	---	---
Insect Morphology (Ent 351).....	---	3	---
General Entomology (Ent 303).....	---	---	4
Electives	7	8	9
	17	17	17

Recommended Electives

Modern Language	3	3	3
Historical Geology (G 302)	---	3	---
Histology (ZP 300)	---	---	5
Chemistry of Spray Materials (Ch 352).....	---	3	---
Introductory Photography (Ph 361).....	3	---	---
Forest Entomology (Ent 321).....	4	---	---

Senior Year

National Government (PS 301).....	3	---	---
Practical Public Speaking I (PSP 254).....	3	---	---
Elementary Industrial Journalism (IJ 200).....	3	---	---
Insect Taxonomy (Ent 452), Insect Ecology (Ent 453).....	---	5	5
Seminar (Ent 481, 482, 483).....	1	1	1
Electives	7	11	11
	17	17	17

Recommended Electives

Modern Language	3	3	3
Methods of Research (Hrt 694, 695).....	2	2	---
Embryology (ZP 310).....	---	---	5
Commercial Bee Culture (Ent 131, 132, 133).....	3	3	3
Farm Motors (AE 111).....	---	---	3

FARM CROPS

Junior Year

Cereal Production (FC 311).....	5	---	---
Principles of Plant Pathology (Bot 311).....	4	---	---
Genetics (ZP 351).....	3	---	---
Crop Inspection (FC 312).....	---	5	---
Farm Accounting (FA 361).....	---	3	---
Farm Management (FMg 302).....	---	4	---
Forage Crops and Root Crops (FC 331).....	---	---	3
Plant Physiology (Bot 321).....	---	---	4
Animal Nutrition (AH 351).....	---	---	4
Agricultural Economics (ES 362).....	---	---	3
Electives	5	5	3
	17	17	17

*Students in Entomology majoring in Bee Culture follow Entomology outline, except that they take Commercial Bee Culture in the junior year and Advanced Bee Culture in the senior year.

Recommended Electives

	Term		
	1st	2d	3d
Practical Pomology (Hrt 311).....	4	---	---
Farm Conveniences (AE 351).....	---	---	2
Elementary Industrial Journalism (IJ 200).....	3	---	---
Breeds of Livestock I (AH 231).....	3	---	---
Farm Implements (AE 131).....	---	2	---
Crop Handling Equipment (AE 332).....	---	2	---
Breeds of Livestock II (AH 232).....	---	3	---
Crop Judging (FC 313).....	---	---	3
Diseases of Field Crops and Vegetables (Bot 313).....	---	3	---
Climatology (SIs 331).....	---	---	2

Senior Year

Seed Production (FC 432).....	3	---	---
Crop Improvement (FC 442).....	5	---	---
Practical Public Speaking I (PSP 254).....	3	---	---
Potato Growing (FC 314).....	---	2	---
Soil Fertility Lectures (SIs 425).....	---	3	---
Crop Efficiency (FC 451).....	---	---	5
Business and Rural Law (PS 163).....	---	---	3
Elementary Psychology (Psy 301).....	---	---	3
Electives	6	12	6
	17	17	17

Recommended Electives

Advanced Crop Work (FC 414, 415, 416).....	3	3	3
Elementary Industrial Journalism (IJ 200).....	3	---	---
Advanced Crop Breeding (FC 443).....	---	3	---
Dairy Herd Management (DH 352).....	---	3	---
Journalism Practice I (IJ 204).....	---	2	---
Markets and Marketing (ES 402).....	---	4	---
Advanced Business Law (PS 201, 202).....	---	4	4
Concrete Construction (AE 341).....	---	---	3

FARM MANAGEMENT**Junior Year**

Farm Accounting (FA 361).....	---	3	---
Genetics (ZP 351).....	3	---	---
Farm Management (FMg 302, 303).....	4	3	---
Animal Nutrition (AH 351).....	---	---	4
Principles of Plant Pathology (Bot 311).....	4	---	---
Agricultural Economics (ES 362).....	---	---	3
Farm Organization (FMg 411).....	---	---	3
Electives	6	11	7
	17	17	17

Recommended Electives

Cereal Production (FC 311) (3 lectures).....	3	---	---
Breeds of Livestock II (AH 232).....	---	3	---
Elementary Industrial Journalism (IJ 200).....	---	3	---
Elementary Typing (ST 111).....	2	---	---
Forage Crops and Root Crops (FC 331).....	---	---	3
Farm Motors (AE 111).....	---	---	3
Business and Rural Law (PS 163).....	---	---	3

Senior Year

	Term		
	1st	2d	3d
Practical Public Speaking I (PSP 254).....	3	---	---
National Government (PS 301).....	---	---	3
Advanced Farm Management (FMg 442, 443).....	---	3	3
Farm Management Seminar (FMg 422, 423).....	---	1	1
Enterprise Costs and Profits (FMg 433).....	3	---	---
Land Economics (FMg 452).....	---	3	---
Electives.....	11	10	10
	17	17	17

Recommended Electives

Soil Physics (SIs 422).....	3	---	---
Diseases of Livestock (VM 341).....	4	---	---
Practical Pomology (Hrt 311).....	4	---	---
Methods of Research (Hrt 694, 695).....	2	2	---
Soil Fertility Lectures (SIs 425).....	---	3	---
Dairy Herd Management (DH 352).....	---	3	---
Markets and Marketing (ES 402).....	---	4	---
Small Fruits and Grapes (Hrt 415).....	---	4	---
Soil Surveying (SIs 427).....	---	---	3
Farm Tractors and Farm Trucks (AE 112).....	---	---	3
Cooperation (ES 323) or Markets and Marketing (ES 603).....	---	---	4

HORTICULTURE—HORTICULTURAL PRODUCTS

Freshman Year

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103).....	3	3	3
General Chemistry (Ch 101, 102, 103).....	3	3	3
General Botany (Bot 101, 102).....	4	4	5
Principles of Zoology (ZP 130).....	---	---	1
Library Practice (Lib 100).....	5	---	---
Crop Production (FC 100).....	---	5	---
Elements of Horticulture (Hrt 100).....	---	---	3
Elementary Industrial Journalism (IJ 200).....	---	---	3
¹ Gymnastics and Calisthenics (PEM 111, 112, 113).....	2 ^½	2 ^½	2 ^½
² Military Science and Tactics.....	2	2	2
	17 ^½	17 ^½	17 ^½

Sophomore Year

Quantitative Analysis (Ch 247).....	5	---	---
Organic Chemistry (Ch 224).....	---	5	---
Agricultural Chemistry (Ch 251).....	---	---	5
Soils (SIs 201, 202).....	3	3	---
General Bacteriology (Bac 201).....	4	---	---
Zymology (Bac 212, 213).....	---	4	4
Introduction to Accounting (FA 101), Principles of Accounting (FA 102), Accounting Practice (FA 103).....	3	3	3
Principles of Economic Entomology (Ent 201).....	---	---	3
Gymnastics and Calisthenics (PEM 211, 212, 213).....	2 ^½	2 ^½	2 ^½
Military Science and Tactics.....	2	2	2
	17 ^½	17 ^½	17 ^½

¹Women carry PEW 111, 112, 113, 121, 122.²Students have the option of entering the infantry unit or the cavalry unit.

Junior Year

	Term		
	1st	2d	3d
Dehydration of Fruits and Vegetables (Hrt 371).....	3	---	---
Plant Physiology (Bot 321).....	---	---	4
Principles of Canning Fruits (Hrt 351), Principles of Canning Vegetables (Hrt 352), The Canning Plant and Its Equip- ment (Hrt 353).....	3	3	3
Practical Pomology (Hrt 311).....	4	---	---
Commercial Pomology (Hrt 410).....	---	5	---
Agricultural Economics (ES 362).....	---	---	3
Pickles, Relishes, and Condiments (Hrt 381).....	3	---	---
Electives	4	9	7
	17	17	17

Senior Year

Fruit Juice and Vinegar Manufacture (Hrt 451).....	3	---	---
Commercial Jam and Jelly Manufacture (Hrt 462).....	---	3	---
Principles of Plant Pathology (Bot 311).....	4	---	---
Preserves, Glacéd Fruits, and Candied Fruits (Hrt 472, 473).....	---	3	3
Practical Public Speaking I (PSP 254).....	---	3	---
National Government (PS 301).....	---	---	3
Business Organization (FA 331), Business Management (FA 332)	3	3	---
Electives	7	5	11
	17	17	17

Recommended Electives

Cost Accounting (FA 301).....	3	---	---
General Physics (Ph 201, 202).....	3	3	---
Machine Shop (IA 262).....	---	2 or	2

HORTICULTURE—LANDSCAPE GARDENING

Freshman Year

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Business Correspondence (Eng 105).....	---	3	---
Plane Surveying (CE 121).....	---	---	5
Modern Language	3	3	3
General Botany (Bot 101, 102).....	4	4	---
Plant Propagation and Greenhouse Practice (Hrt 241).....	---	3	---
Elements of Horticulture (Hrt 100).....	---	---	5
Plane Trigonometry (Mth 111).....	4	---	---
Library Practice (Lib 100).....	1	---	---
¹ Gymnastics and Calisthenics (PEm 111, 112, 113).....	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
² Military Science and Tactics	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
	17 $\frac{1}{2}$	18 $\frac{1}{2}$	18 $\frac{1}{2}$

¹Women carry PEw 111, 112, 113, 121, 122.²Students have the option of entering the infantry unit or the cavalry unit.

Sophomore Year

	Term		
	1st	2d	3d
¹ English elective	3	3	3
Modern Language	3	3	3
Plane Surveying (CE 122, 123).....	3	4	5
General Geology (G 301c).....	3	---	---
Plant Identification (Bot 203).....	---	---	3
Drawing (A 213).....	3	---	---
Pencil and Pen Rendering (A 251).....	---	---	3
Landscape Gardening (Hrt 231).....	3	---	---
Practical Public Speaking I (PSP 254).....	---	3	---
Gymnastics and Calisthenics (PEm 211, 212, 213).....	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics.....	2	2	---
Elective	---	---	---
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	16 $\frac{1}{2}$

Junior Year

Introduction to Economics (ES 391).....	3	---	---
Practical Public Speaking II (PSP 255).....	---	3	---
Argumentation (PSP 257).....	---	---	3
Color Rendering (A 351, 352).....	---	3	3
Plant Materials (Hrt 331, 332, 333).....	3	3	3
History and Literature of Landscape Gardening (Hrt 337).....	3	---	---
Elementary Industrial Journalism (IJ 200).....	3	---	---
Landscape Drawing (A 311, 312, 313).....	3	3	3
Electives	3	5	5
	18	17	17

Senior Year

National (PS 301), State and Local Government (PS 302).....	3	3	---
Theory and Design (Hrt 431, 432).....	4	4	---
Town Planning (Hrt 437).....	---	---	4
Field Practice (Hrt 434, 435).....	4	---	4
Business and Rural Law (PS 163).....	---	---	3
Business Management (FA 332).....	---	3	---
Electives	6	5	6
	17	15	17

HORTICULTURE—POMOLOGY

Junior Year

Practical Pomology (Hrt 311).....	4	---	---
History and Literature of Horticulture (Hrt 361).....	---	---	3
Farm Accounting (FA 361).....	---	3	---
Farm Management (FMg 302).....	---	4	---
Agricultural Economics (ES 362).....	---	---	3
Genetics (ZP 351).....	3	---	---
Plant Physiology (Bot 321).....	---	---	4
Principles of Plant Pathology (Bot 311), Fruit Diseases (Bot 312).....	4	---	3
Pruning and Spraying (Hrt 313).....	---	5	---
Electives	6	5	4
	17	17	17

¹English 201 must be taken one term.

Recommended Electives

	Term		
	1st	2d	3d
Sub-tropical Pomology (Hrt 312) (Junior or Senior).....	3	.....	.....
Small Fruits and Grapes (Hrt 415) (Junior or Senior).....	.....	4	.....
Nut Culture (Hrt 416) (Junior or Senior).....	.....	2	.....
Applied Plant Genetics (Hrt 418) (Junior or Senior).....	.....	.....	3
Cooperation (ES 323).....	.....	.....	4
General Sociology (ES 305).....	4 or 3	4 or 3	4 or 3
Elementary Psychology (Psy 301).....	3	3	3
Elementary Industrial Journalism (IJ 200).....	3 or 3	3 or 3	3
Elementary French (ML 111, 112, 113).....	3	3	3
Elementary German (ML 131, 132, 133).....	3	3	3
Plant Propagation and Greenhouse Practice (Hrt 241).....	.....	3	.....

Senior Year

Systematic Pomology (Hrt 412).....	5	.....	.....
Commercial Pomology (Hrt 410).....	.....	5	.....
Seminar (Hrt 481, 482, 483).....	1	1	1
Advanced Economic Entomology (Ent 404).....	3	.....	.....
Practical Public Speaking I (PSP 254).....	3	.....	.....
National Government (PS 301).....	.....	.....	3
Electives.....	5	11	13
	<hr/>	<hr/>	<hr/>
	17	17	17

Recommended Electives

Methods of Research (Hrt 694, 695).....	2	2	.....
Orchard Practices and Management (Hrt 417).....	.....	.....	3
Investigative Work for Seniors in Horticulture (Hrt 491, 492, 493).....	3	3	3
Markets and Marketing (ES 402).....	.....	4	.....
Dehydration of Fruits and Vegetables (Hrt 371).....	3	.....	.....
Transportation (ES 403).....	.....	.....	4
Intermediate French (ML 211, 212, 213).....	3	3	3
Intermediate German (ML 231, 232, 233).....	3	3	3
American Literature II (Eng 432).....	.....	3	.....

HORTICULTURE—VEGETABLE GARDENING

Junior Year

	Term		
	1st	2d	3d
Farm Accounting (FA 361).....	.....	3	.....
Farm Management (FMg 302).....	.....	4	.....
Agricultural Economics (ES 362).....	.....	.....	3
Genetics (ZP 351).....	3	.....	.....
Principles of Plant Pathology (Bot 311).....	4	.....	.....
Plant Physiology (Bot 321).....	.....	.....	4
Vegetable Seed Production (Hrt 321), Principles of Vegetable Gardening (Hrt 322), Practical Vegetable Gardening (Hrt 323).....	3	3	3
Electives.....	7	7	7
	<hr/>	<hr/>	<hr/>
	17	17	17

Recommended Electives

Irrigation Farming (SIs 311).....	3	.....	.....
Greenhouse Construction (Hrt 341).....	.....	4	.....
Landscape Gardening (Hrt 231).....	3	.....	.....
Potato Growing (FC 314).....	.....	2	.....
Advanced Economic Entomology (Ent 404).....	3	.....	.....
History and Literature of Horticulture (Hrt 361).....	.....	.....	3
Diseases of Field Crops and Vegetables (Bot 313).....	.....	3	.....

Senior Year

	Term		
	1st	2d	3d
Practical Public Speaking I (PSp 254).....	3	---	---
National Government (PS 301).....	3	---	---
Seminar (Hrt 481, 482, 483).....	1	1	1
Vegetable Forcing (Hrt 421, 422, 423).....	2	2	2
Systematic Olericulture (Hrt 424).....	2	---	---
Vegetable Marketing (Hrt 425, 426), Commercial Truck Gardening (Hrt 427).....	3	3	3
Electives	3	11	11
	<u>17</u>	<u>17</u>	<u>17</u>

Recommended Electives

Methods of Research (Hrt 694, 695).....	2	2	---
Investigative Work for Seniors in Horticulture (Hrt 491, 492, 493).....	3	3	3
Small Fruits and Grapes (Hrt 415).....	---	4	---
Dehydration of Fruits and Vegetables (Hrt 371).....	3	---	---
Markets and Marketing (ES 402, 603).....	---	4	4
Transportation (ES 403).....	---	---	4
Enterprise Costs and Profits (FMg 433).....	3	---	---

MARKETING OF AGRICULTURAL PRODUCTS

Junior Year

	Term		
	1st	2d	3d
Rural Finance (ES 367).....	3	---	---
Economic Organization of Agriculture (ES 364).....	---	3	---
Rural Sociology (ES 464).....	---	---	3
Business Organization (FA 331).....	3	---	---
Farm Accounting (FA 361).....	---	3	---
Agricultural Economics (ES 362).....	---	---	3
Courses in Agriculture.....	5	5	5
Electives	6	6	6
	<u>17</u>	<u>17</u>	<u>17</u>

Recommended Electives

Breeds of Livestock I, II (AH 231, 232).....	3	3	---
Stock Judging II (AH 311).....	---	---	3
Elementary Industrial Journalism (IJ 200).....	3	---	---
Cereal Production (FC 311).....	5	---	---
The Business Cycle (ES 411).....	3	---	---
Advanced Business Law (PS 201, 202).....	---	4	4
Elementary Psychology (Psy 301).....	---	---	3

Senior Year

Public Finance (ES 401).....	4	---	---
Markets and Marketing (ES 402, 603).....	---	4	4
Transportation (ES 403).....	---	---	4
National Government (PS 301), State and Local Government (PS 302), Municipal Government (PS 303).....	3	3	3
Principles of Advertising (FA 441).....	---	3	---
Courses in Agriculture.....	3	3	3
Electives	7	4	3
	<u>17</u>	<u>17</u>	<u>17</u>

Recommended Electives

	Term		
	1st	2d	3d
Crop Inspection (FC 312).....	---	5	---
Crop Efficiency (FC 451).....	---	---	5
Enterprise Costs and Profits (FMg 433).....	---	---	3
Commercial Pomology (Hrt 410).....	---	5	---
Systematic Pomology (Hrt 412).....	5	---	---
Vegetable Marketing (Hrt 425, 426).....	3	3	---

POULTRY HUSBANDRY

Junior Year

Farm Accounting (FA 361).....	---	3	---
Farm Management (FMg 302).....	---	4	---
Agricultural Economics (ES 362).....	---	---	3
Genetics (ZP 351).....	3	---	---
Anatomy of the Fowl (VM 309).....	---	3	---
Animal Nutrition (AH 351).....	4	---	---
Diseases of Poultry (VM 351).....	---	---	3
Poultry Breeding, Breeds and Judging (PH 311).....	4	---	---
Incubation and Brooding (PH 321).....	---	4	---
Poultry-house Design and Construction (PH 331).....	---	---	4
Electives	6	3	7
	17	17	17

Senior Year

Practical Public Speaking I (PSp 254).....	3	---	---
National Government (PS 301).....	3	---	---
Poultry Feeding (PH 441).....	4	---	---
Marketing Poultry Products (PH 451).....	---	4	---
Poultry Plant Management (PH 463).....	---	---	4
Seminar (PH 481, 482, 483).....	1	1	1
Departmental Management (PH 484, 485, 486).....	3	3	3
Electives	3	9	9
	17	17	17

SOILS

Junior Year

Farm Accounting (FA 361).....	---	3	---
Farm Management (FMg 302).....	4	---	---
Agricultural Economics (ES 362).....	---	---	3
Genetics (ZP 351).....	3	---	---
Animal Nutrition (AH 351).....	---	---	4
Principles of Plant Pathology (Bot 311).....	4	---	---
Plant Physiology (Bot 321).....	---	---	4
Irrigation Farming (Sls 311).....	3	---	---
Western Land and Water Laws (Sls 314).....	---	3	---
Land Drainage (Sls 318), or Climatology (Sls 331) alternate years (2 credits)	---	---	3
Electives	3	11	3
	17	17	17

Recommended Electives

	Term		
	1st	2d	3d
Practical Pomology (Hrt 311).....	4	.....	.....
Elementary Industrial Journalism (IJ 200).....	.....	3	.....
Forage Crops and Root Crops (FC 331).....	.....	.....	3
Agricultural Analysis (Ch 351a).....	3	.....	.....
Soil Bacteriology (Bac 321).....	4	.....	.....
General Geology (G 301c).....	.....	.....	3
Business and Rural Law (PS 163) or Markets and Marketing (ES 402).....	.....	.....	4
Option preparatory to teaching, 3 credits per term in Agricultural Education	3	3	3

Senior Year

Practical Public Speaking I (PSP 254).....	.....	.....	3
National Government (PS 301).....	.....	3	.....
Soil Physics (Sls 421).....	5	.....	.....
Soil Fertility (Sls 424).....	.....	5	.....
Soil Survey (Sls 427).....	.....	.....	3
Soil Management (Sls 428).....	.....	.....	3
Advanced Irrigation (Sls 414).....	3	.....	.....
Advanced Soil Work (Sls 442, 443).....	.....	3	3
Soil Seminar (Sls 481, 482, 483).....	1	1	1
Soil Bacteriology (Bac 321).....	4	.....	.....
Electives	4	5	4
	17	17	17

Recommended Electives

Elementary Psychology (Psy 301).....	3	.....	.....
Plane Surveying (CE 226).....	3	.....	.....
Hydraulic Laboratory (Hyd 460).....	.....	3	.....
Irrigation Operation (Hyd 463).....	.....	.....	3
Physical Chemistry (Ch 381, 382, 383).....	3	3	3

ZOOLOGY**Junior Year**

Practical Public Speaking I (PSP 254).....	.....	3	.....
Finance and Administration, elective.....	3	.....	.....
Political Science, elective.....	.....	3	.....
Economics or Sociology, elective.....	3	.....	.....
Principles of Plant Pathology (Bot 311).....	4	.....	.....
Plant Physiology (Bot 321).....	.....	.....	4
Farm Management (FMg 302).....	.....	4	.....
Genetics (ZP 351).....	3	.....	.....
Evolution and Eugenics (ZP 353).....	.....	.....	3
Histology (ZP 300).....	.....	.....	5
Animal Parasites (ZP 362).....	.....	3	.....
Electives	4	4	5
	17	17	17

Recommended Electives

German or French	3	3	3
College Mathematics (Mth 201, 202, 203).....	3	3	3

Senior Year

Advanced Study and Thesis (ZP 691, 692, 693).....	3	3	3
Embryology (ZP 310) .....	.....	.....	5
Electives	14	14	9
	17	17	17

Recommended Electives

German or French.....	3	3	3
General Physics (Ph 201, 202).....	3	3	....
Elementary Industrial Journalism (IJ 200).....	3	....	....
Introductory Photography (Ph 361).....	....	....	3
Physiological Chemistry (Ch 461).....	....	....	3
Insect Morphology (Ent 351).....	....	3	....

CURRICULUM FOR WOMEN

The following outline is suggested as meeting the interests and needs of the majority of women students in Agriculture. Women desiring a more specialized course should consult with the Dean.

Freshman Year

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103).....	3	3	3
General Chemistry (Ch 101, 102, 103).....	3	3	3
General Botany (Bot 101, 102).....	4	4	....
Principles of Zoology (ZP 130).....	....	5	....
Crop Production (FC 100).....	5	....	....
Elements of Horticulture (Hrt 100).....	....	....	5
Stock Judging I (AH 111).....	....	....	3
Social Ethics (PEW 121), Hygiene (PEW 122).....	1	1	....
Library Practice (Lib 100).....	....	....	1
Gymnastics (PEW 111, 112, 113).....	1	1	1
	17	17	16

Sophomore Year

Quantitative (Ch 247), Organic (Ch 224), Agricultural Chemistry (Ch 251).....	5	5	5
Soils (Sls 201, 202).....	3	3	....
Elements of Dairying (DH 200).....	....	....	4
Farm Accounting (FA 361).....	3	....	....
Practical Poultry Keeping (PH 201).....	....	3	....
Vegetable Growing (Hrt 221).....	....	....	3
Clothing and Textiles (HA 108, 109, 110).....	4	4	4
Gymnastics (PEW 111, 112, 113).....	1	1	1
	16	16	17

Junior Year

Agricultural Economics (ES 362).....	....	....	3
General Bacteriology (Bac 201).....	4	....	....
Farm Management (FMg 302).....	....	4	....
Genetics (ZP 351).....	3	....	....
Principles of Economic Entomology (Ent 201).....	....	3	....
Plant Physiology (Bot 321).....	....	....	4
Food Selection and Preparation (HS 203, 204, 205).....	4	4	4
Agricultural electives.....	5	4	4
	16	15	15

Senior Year

Principles of Plant Pathology (Bot 311).....	4	....	....
Practical Public Speaking I (PSP 254).....	....	3	....
National Government (PS 301).....	....	3	....
Elementary Psychology (Psy 301).....	....	....	3
Landscape Gardening (Hrt 231).....	3	....	....
Home Nursing (HAD 430).....	3	....	....
Child Care (HAD 325).....	....	....	3
Agricultural options.....	....	5	5
Electives.....	6	5	4
	16	16	15

AGRICULTURAL ENGINEERING

The purpose and scope of the work in Agricultural Engineering are indicated fully in the description of courses given below.

Equipment. The most up-to-date farm machinery is lent the institution by the leading implement dealers of the Northwest, so that the student has constantly before him and is working with and studying the very best farm machines of all types. The large, well-lighted gas-engine laboratory contains many different makes of gas engines, trucks and tractors, and accessories, such as sectional carburetors, magnetos, and lubricators.

The laboratory is also equipped with two large brakes for the testing of tractors, dynamometers for determining the draft of the field machines and the draw-bar horse-power of tractors, a gas and steam indicator for determining the efficiency of farm engines and tractors, and an electric motor and watt meter, so that the student may become familiar with the power requirements of belt-driven farm machines. Many tractors of the latest design are available for use of the students in the laboratory and in the field.

Light and water systems, septic tanks, and other equipment for the farm home are installed in the Farm Conveniences Laboratory. The design of farm structures and graphic methods are taught in a room provided with filing cases, blueprinting equipment, and individual drafting tables equipped with T squares and triangles.

COURSES

AE 111. Farm Motors. The principle, construction, operation, and adjustment of farm motors and accessories, carburetors, magnetos, ignition, governing, cooling, and lubricating systems; fuels and oils; testing, timing, and trouble hunting of farm gas motors, such as are used in the tractor, truck, automobile, and stationary outfits; adaptation of electricity to farm uses.

Optional; sophomore year; any term; 3 credits; 3 two-hour laboratory and recitation periods. Fee \$2.00. *W. J. Gilmore*

AE 112. Farm Tractors and Farm Trucks. Detailed study and operation of the tractor, truck, and automobile; indicated, brake, and draw-bar horsepower tests of tractors; tractor operation in the field.

Prerequisite: AE 111. Elective; any term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$3.00. *A. E. Jensen*

AE 121. Farm Motor and Farm Implement Repair. Repair of engines, tractors, trucks, and automobiles.

Prerequisite: AE 111. Elective; freshman or sophomore year; any term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$3.00. *A. E. Jensen*

AE 131. Farm Implements. Study of the latest horse- and tractor-drawn farm implements, plows and their adjustments and hitches, cultivating machinery, seeding and planting machines, hay and grain cutting machines, and manure spreaders; rope tying and splicing; fences and roads; setting up and adjustment of machines.

Elective; sophomore, junior, or senior year; any term; 2 credits; 2 two-hour laboratory and recitation periods. Fee \$1.00. *W. J. Gilmore*

AE 141. General Farm Repairs. Babbitting and fitting bearings, soldering, belt lacing, key fitting, pipe fittings, and pipe cutting and fitting, welding and tempering, repairing, adjusting, and painting farm machines.

Elective; freshman, sophomore, or junior year; any term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$2.00. *A. E. Jensen*

AE 280. Graphic Methods. Plotting and charting of figures and statistics relating chiefly to agricultural subjects; analyzing such material, putting it into a form which is easily read and understood, and charting the material in an attractive manner; use of drawing instruments.

Elective; sophomore year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$0.50. *W. J. Gilmore*

AE 321. Farm Shop I. For prospective teachers of vocational agriculture who will be required to teach Farm Shop. This course includes the construction and repair work relating to the needs of the farm and farm home, and involves carpentry, blacksmithing, concrete work, soldering, babbitting, harness repair, rope work, and tool sharpening.

Required in Agricultural Education; elective to others except those who have had AE 141; senior year; first term; 3 credits; 3 two-hour laboratory periods.

AE 322. Farm Shop II. A continuation of AE 321. For the benefit of Agriculture students planning to teach Smith-Hughes agriculture.

Prerequisite: AE 321. Required in Agricultural Education; senior year; third term; 3 credits; 3 two-hour laboratory periods.

AE 332. Crop Handling Equipment. A detail study of all machines used in handling of crops in field, on the farm, and in storage; fanning-mills; grain graders and crushers; grain separ-

rators and combines; farm elevators; racks; balers; silage cutters. This course is especially designed for students in Crop Production, and for students of the grain farms who desire a knowledge of adjusting and handling of the thresher and combine.

Required in Farm Crops; elective to others; junior or senior year; second or third term; 2 credits; 1 lecture; 1 three-hour laboratory period. Fee \$1.50. *W. J. Gilmore*

AE 341. Concrete Construction. The selection, proportioning, mixing, and placing of concrete for floors, sidewalks, machine bases, and foundations. The building of forms is a part of the work.

Elective; junior or senior year; third term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$2.00. *W. J. Gilmore*

AE 351. Farm Conveniences. Installation of farm water-supply systems, and farm electric-lighting plants; pipe fitting and plumbing; meter reading; wells, pumps, hydraulic rams, and storage systems. Open to either men or women who desire a knowledge of modern farm conveniences with a view to installation.

Elective; sophomore, junior, or senior year; third term; 2 credits; 1 recitation; 1 three-hour laboratory period. Fee \$2.00. *W. J. Gilmore*

AE 361. Land Clearing. The use of explosives, hand stump-pullers, horse pullers; tractor and donkey engine for removing stumps, char-pitting, stump burning, and chemical treatment; what is being done in other states; clearing and leveling of sage brush and swamp lands.

Elective; junior or senior year; third term; 2 credits; 1 recitation; 1 three-hour laboratory period. Fee \$2.00. *W. J. Gilmore*

AE 371. Dairy Mechanics. Proportioning and mixing of concrete for floors, sidewalks, and machine bases; study and operation of gas engines and accessories; pumps, steam boilers, and steam engines; firing and operating steam engines; flue repair; babbitting; soldering; pipe fitting; line shafts and belting. Especially adapted to the needs of students in Dairying.

Elective; junior or senior year; first term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$2.00. *A. E. Jensen*

AE 372. Orchard Machinery. Construction, operation, and adjustment of orchard machinery, such as gas engine, pump, tillage and seeding implements; orchard plowing and cultivation; demonstration of tractors for orchard work. Intended for students in Horticulture.

Elective; junior or senior year; third term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$2.00.

W. J. Gilmore, A. E. Jensen

AE 373. Irrigation Farm Mechanics. This course is intended for students interested in farm irrigation, and is designed for junior and senior students in Soils. It deals with the farm gas and electric motor, pumps, concrete construction, and the study and installation of farm pumping plants.

Elective; junior or senior year; third term; 3 credits; 1 recitation; 2 laboratory periods. Fee \$2.00.

W. J. Gilmore

AE 380. Farm Structures. Planning of all farm buildings, fences, etc.; building materials; foundations; construction; lighting; ventilating; heating; costs; convenience of farm structures; plans and specifications; design and construction of farm racks, tanks, troughs, etc.

Elective; junior or senior year; any term; 1 recitation; 2 three-hour laboratory periods. Fee \$2.00.

W. J. Gilmore

AE 381. Advanced Farm Mechanics. A continuation of AE 112, 121. This course is designed primarily to fit students for positions with tractor and implement companies as demonstrators or as service men. It is also of much value to those who intend to operate farm power equipment. Recommended to students having had AE 111, 112, and 121 and who feel need of further study of farm power equipment. Detail study of design of farm power equipment; practical field work; tractor and truck service.

Prerequisites: AE 111, 112, 121. Elective; any year; any term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$3.00.

A. E. Jensen

ANIMAL HUSBANDRY

The courses in Animal Husbandry are planned to fit the student for the actual raising of livestock on the farm so that he may produce the highest grade of stock in the most economical and business-like manner. 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 also thoroughly treated and a special effort is made to keep the student in close touch with the financial phases of the industry. Students who take this work as their specialty are expected not to devote their entire time to livestock; but, on the contrary, to familiarize themselves with crop production, soil fertility, and other phases of agriculture as well as general education subjects.

Students electing to major in Animal Husbandry must have had considerable practical experience in farming and stock raising before they may be graduated. The nature and extent of the experience required is left to the judgment of the head of the department.

Students not majoring in Animal Husbandry but desiring to elect some work in the department will be given careful attention to see that they get just the work fitted to their individual needs.

Equipment. The equipment of the department of Animal Husbandry consists essentially of livestock, barns, and the College stock farms. During the past years the livestock available for illustration and demonstration purposes has been very much improved in numbers and quality. In addition to the livestock regularly kept on the College farm, much good stock is lent from time to time by the leading breeders of the state. During the winter, car-lots illustrating the market classes are brought in for demonstration purposes. The department possesses abundant equipment for the conduct of laboratory, lecture, and recitation work.

COURSES

AH 111. Stock Judging I. The various types of farm animals are studied by score cards and comparative methods, and the student is made familiar with the desirable and undesirable types of beef and dairy cattle, sheep, swine, and horses.

Required in Agriculture; freshman year; any term; 3 credits; 1 recitation; 3 two-hour laboratory periods. Fee \$0.25.

AH 221. Livestock Management. Practical details of the care and management of livestock, stabling, grooming, sanitation, practical feeding, and kindred details of livestock farming, all with special reference to Western conditions.

Required in Agriculture; sophomore year; any term; 4 credits; 3 recitations; 1 two-hour laboratory period. Fee \$0.50.

AH 231. Breeds of Livestock I. A study of the breeds of sheep and beef cattle, their development, breeding, and type.

Prerequisite: AH 111. Elective; sophomore or junior year; first term; 3 credits; 3 recitations. Fee \$0.25.

A. W. Oliver, B. W. Rodenwold

AH 232. Breeds of Livestock II. A study of the breeds of horses and swine, their development, breeding, and type.

Prerequisite: AH 111. Elective; sophomore or junior year; second term; 3 credits; 3 recitations. Fee \$0.25.

AH 311. Stock Judging II. Course in judging of all kinds of stock.

Prerequisite: AH 111. Elective; junior year; third term; 3 credits; 4 two-hour laboratory periods. Fee \$0.25.

B. W. Rodenwold

AH 351. Animal Nutrition. The chemical and physiological principles of animal nutrition; function of the various classes of nutrients when taken into the animal body; nutritive ratios; feeding standards; compounding ratios; feeds with special reference to chemical composition, energy, values, and general adaptability to stock-feeding purposes.

Prerequisite: Ch 251. Required in Agriculture; junior year; first or third term; 4 credits; 4 recitations.

O. M. Nelson

AH 352. Feeds and Feeding. An advanced course in the feeding of horses, beef cattle, sheep, and swine. Special study is made of the practices of the best stockmen, and of investigations carried on by the various experiment stations. Students desiring to take only such parts of the course as relate to certain kinds of livestock will be permitted to do so by arrangement with the head of the department.

Prerequisite: AH 351. Required in Animal Husbandry; junior year; second term; 5 credits; 5 recitations.

E. L. Potter

AH 411. Stock Judging III. Practical judging of all kinds of livestock, with occasional trips to fairs and stock farms. Judging teams for the Pacific International Stock Show are chosen largely from among the members of this class.

Prerequisites: At least four credits in stock judging. Elective; senior year; first term; 4 credits; 5 two-hour laboratory periods. Fee \$0.25.

E. L. Potter

AH 421. Livestock Practice. Laboratory practice in such work as dipping, dehorning, hoof trimming, shearing, horse training, and other common operations of the stock farm. (Note: The department reserves the right to limit the number of students in this course.)

Elective; senior year; first term; 1 credit; 1 three-hour laboratory period.

B. W. Rodenwold

AH 422. Livestock Practice. A continuation of AH 421.

Elective; senior year; third term; 2 credits; 2 three-hour laboratory periods. Fee \$1.00.

B. W. Rodenwold

AH 471. Meats. A study of meats of all classes of meat animals, covering butchering, location and cutting of standard and retail cuts, judging meat raw and cooked, economics of meat pro-

duction, sanitation and inspection, abattoirs, packing houses, and retail markets.

Elective; senior year; second term; 2 credits; 2 three-hour laboratory periods. Fee \$0.75. *A. W. Oliver*

AH 475. Meats. Same as AH 471 eliminating butchering.

Recommended in one-year Institutional Management Curriculum; elective in Home Economics; junior or senior year; second or third term; 1 credit; 1 three-hour laboratory period. Fee \$0.75. *A. W. Oliver*

AH 491. Investigative Work. The student selects some topic for individual investigation by library methods or otherwise. The object is: first, to allow the student to study some particular subject in which he is especially interested; and second, to give him training in working out problems for himself, such as he will have to undertake after leaving college.

Elective in Animal Husbandry; senior year; any term; credits and hours to be arranged. *E. L. Potter*

AH 611. Stock Judging IV. Continuation of AH 411.

Prerequisite: AH 411. Elective; senior or graduate year; first term; 4 credits; 5 two-hour laboratory periods. Fee \$0.25. *E. L. Potter*

AH 645. Pedigree Study. A laboratory study of the blood lines of the various breeds of livestock. Each student is expected to select one or two breeds as the basis for special study rather than to attempt to cover all breeds.

Elective; senior or graduate year; first or second term. Credits and hours to be arranged. *B. W. Rodenwold*

AH 661. Livestock Economics. An advanced course in management, dealing particularly with economic and financial phases of livestock production.

Prerequisite: AH 352. Required in Animal Husbandry; senior or graduate year; third term; 5 credits; 5 recitations. *E. L. Potter*

AH 691. Thesis and Graduate Study. Graduate students are given opportunity to carry on research work along any lines desired. The department is well equipped for graduate work along lines of experimental feeding of hogs, sheep, and beef cattle, livestock management, and all forms of library work with either experiment station or general livestock literature.

Elective; graduate year; any term; credits and hours to be arranged. *E. L. Potter*

DAIRY HUSBANDRY

There are approximately 23,000,000 dairy cows in the United States at the present time. It is estimated that one-sixth of the food supply of the nation is derived from milk and its products. As the population of the country becomes more congested an increasing proportion of the animal food of the country will come from this source. Dairying is one of the most important agricultural industries of Oregon and the Pacific Northwest. Climatic conditions especially adapt this region to successful dairying.

The student who plans to specialize in dairying may elect either dairy production or dairy manufacturing. The courses in dairy production are designed primarily to fit the student for dairy farming, although he may enter upon extension, experiment station, or teaching work. The dairy manufacturing courses are designed to fit the student for creamery manager, buttermaker, cheesemaker, or other special phases of dairy manufacturing work or experiment station, teaching, inspection of dairy products, and commission work.

Equipment. The department has a herd of about 150 head of pure-bred dairy cattle representing the four major dairy breeds. These animals are available for both instructional and experimental purposes and each year are used in teaching judging alone to more than 300 students. The herd is being developed in such a way as to be of unusual value in illustrating the important points in breeding dairy cattle. The quality of the herd is indicated by the excellent record made by thirty-four animals taken on the Northwest Fair Circuit in 1921, where they won more than 150 premiums, including twelve championships and four grand championships.

The department has a well-equipped manufacturing laboratory. The manufacture of butter, ice-cream, and cottage cheese, and the handling of market milk, are carried on continuously on a commercial scale. The student thus has opportunity to see this work done under practical conditions, and he receives his systematic instruction under the same conditions. A modern cold-storage plant has been recently installed, including an 8-ton ammonia compressor, a 20,000-lb., zero-degree butter storage room, and a 150-gallon five-degrees-below-zero ice-cream hardening room, together with necessary brine tanks.

COURSES

DH 200. **Elements of Dairying.** Fundamental principles and correct practices of modern dairying; testing of milk and cream; principles of buttermaking; operation of farm separators.

Prerequisite: Ch 103. Required in Agriculture; sophomore year; any term; 4 credits; 3 lectures; 2 two-hour laboratory periods. Fee \$4.00. Deposit \$2.00. *H. N. Colman, E. E. Anderson*

DH 204. **Advanced Testing.** Theory and practice of the various tests used to determine the composition of milk, cream, butter, cheese, and condensed milk in factories; tests for adulterants and preservatives; methods of standardizing testing solutions. This course is prerequisite to the dairy manufacturing subjects.

Prerequisite: DH 200. Elective; junior year; first or third term; 3 credits; 1 lecture; 2 two-hour laboratory periods. Fee \$3.00. Deposit \$2.00. *V. D. Chappell, E. E. Anderson*

DH 301. **Market Milk.** To train for the production of market milk and for work in city milk plants and as milk inspectors. Distribution problem of the small town and city; methods of buying, standardizing, and distributing milk from the point of view of the plant owner or manager.

Prerequisite: DH 204. Required in Dairy Husbandry; junior year; third term; 3 credits; 2 lectures; 1 two-hour laboratory period. Fee \$2.00. Deposit \$1.00. *H. N. Colman*

DH 302, 303. **Commercial Buttermaking.** This subject is taught from the point of view of the inside operation of the creamery. The instruction includes the theory and practice of buttermaking and the operation of creamery equipment.

Prerequisite: DH 204. Elective; junior year; first and second terms; 3 credits each term; 2 lectures; 1 four-hour laboratory period. Fee \$3.00. Deposit \$2.00. *V. D. Chappell*

DH 304. **Dairy Products Judging.** Judging of butter, cheese, and milk with score cards; discussion of defects.

Elective; junior year; third term; 1 credit; 1 two-hour laboratory period. Fee \$2.00. *V. D. Chappell*

DH 351. **Dairy Breed Types.** The correlation of the form of dairy cattle with milk production; gross breed characteristics; comparative judging, terminology of the show ring, and fitting for show.

Prerequisite: AH 111. Elective (junior year; optional in sophomore year); third term; 3 credits; 3 two-hour laboratory periods. Fee \$0.50. *R. C. Jones*

DH 352. **Dairy Herd Management.** History and characteristics of the breeds of dairy cattle and their adaptability to various conditions; the selection of a breed; development of a herd; keeping of records; raising calves and heifers; the principles of feeding dairy cattle.

Prerequisite: AH 351. Elective; junior year; second term; 3 credits; 3 lectures. *P. M. Brandt*

DH 401. **Cheesemaking.** Theory and practice of cheesemaking, manufacture of Cheddar cheese; practice in the manufacture of the common soft types, including cottage, Neufchatel, and club; the fundamental scientific principles of chemistry and bacteriology involved; judging cheese.

Prerequisite: DH 204. Elective; senior year; second term; 4 credits; 2 lectures; 1 eight-hour laboratory period. Fee \$3.00. Deposit \$2.00. *V. D. Chappell*

DH 402. **Ice-cream and Condensed Milk.** The manufacture and sale of ice-creams and ices; manufacture of condensed milk; emphasis on the relation of these industries to each other and to the dairy industry in general.

Prerequisite: DH 200. Elective; senior year; third term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$4.00. *V. D. Chappell*

DH 403. **Factory Organization and Management.** Taught from the standpoint of the factory owner or manager, correlating all the practices taught in factory methods with the problem of factory management. Leaks, efficiency, selling, etc.

Prerequisites: DH 303, 401. Elective; senior year; first term; 4 credits; 3 lectures; 1 laboratory period. Fee \$1.00. *V. D. Chappell*

DH 451. **Advanced Dairy Breed Types.** Judging of all classes of dairy cattle. Judging teams for the Pacific International students' judging contest are chosen from members of this class.

Prerequisite: DH 351. Elective; junior or senior year; first term; 2 credits; several laboratory periods a week and short trips to farms. Fee \$0.50. *R. C. Jones*

DH 452. **Breeding Dairy Cattle.** The application of the principles of genetics to the breeding of dairy cattle; selecting breeding animals; planning the breeding policy of a herd; study of pedigrees.

Prerequisite: ZP 351. Elective; senior year; second term; 3 credits; 3 lectures. Fee \$0.50. *R. C. Jones*

DH 453. **Milk Production.** A further study of feeding for milk production; more detailed study of various feeding standards and recent feeding investigations; special problems.

Prerequisite: AH 351. Required in Dairy Husbandry and in Agricultural Chemistry; senior year; third term; 3 credits; 3 lectures. *P. M. Brandt*

DH 454. **Dairy Products Judging Team.** To train students for intercollegiate products judging contests.

Prerequisite: DH 304. Elective; senior year; first term; 2 credits; 3 two-hour laboratory periods. Fee \$2.00. *V. D. Chappell*

DH 481, 482, 483. **Seminar.** The object of this course is to train the student to do independent work and to develop the spirit of research. Each student prepares papers and discussions on recent scientific work.

For senior and graduate students; three terms; 1 credit each term; 1 recitation. *P. M. Brandt*

DH 490, 491, 492. **Special Studies.** Students who have demonstrated their ability to do independent work may pursue special studies along various lines of investigation. This is to be under the supervision of various members of the staff. Credit to be arranged. *P. M. Brandt, V. D. Chappell, R. C. Jones*

DH 691, 692, 693. **Thesis and Graduate Study.** Graduate students who desire to pursue advanced work may take up problems which they are qualified to study. Credit to be arranged.

P. M. Brandt, V. D. Chappell, R. C. Jones

FARM CROPS

This department deals with the problems of production, improvement, marketing, manufacture, and uses of each of the field crops produced for food, forage, textile, and special purposes. The purpose of the work is primarily to teach students scientific, practical, and economical methods of crop production 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 civil service positions in agronomy, forage crops, grain standardization, plant breeding, crop marketing, etc., or for experiment station, extension, or teaching work. The object is to turn out men with broad training along general lines and well finished in Farm Crops. Considerable flexibility in electives is allowed 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. The field is a large one and deals principally with well-known and staple crops that are constantly in use and in demand. The work is closely associated with the daily food supply and is of importance to all students of Agriculture, whether seeking a salaried position or expecting to engage in the operation or management of a farm.

Equipment. The department has excellent recitation rooms and well-equipped laboratories. The Experiment Station plots and farm fields offer excellent opportunities for field study and make possible extensive collection of valuable material for class work. A large collection of the best books, periodicals, etc., dealing with the subject, is available. The Oregon Agricultural College is excellently equipped for grain grading and inspection work; the crop inspection and grading work is a marked improvement over anything heretofore offered.

COURSES

FC 100. Crop Production. Fundamental principles of economic crop production; storage, marketing, and uses of leading cereal, forage, and special field crops; production costs; methods of improvement; crop rotations; and weed control methods. A course of foundation principles, prerequisite to all Farm Crops courses except FC 351 and 361.

Required in Agriculture; freshman year; any term; 5 credits; 3 lectures; 2 two-hour laboratory periods. Fee \$0.50.

G. R. Hyslop, C. C. Ruth, E. N. Bressman

FC 311. Cereal Production. A thorough study of the production and uses of cereals and allied grains from seed to consumer; varieties; distribution; adaptability; best production methods; markets; manufacture and use of cereals; cereal judging; effects of seed treatment; studies of material in the field.

Prerequisites: FC 100; Bot 101, 102. Required in Farm Crops; elective to others; junior year; first term; 5 credits; 3 recitations; 2 two-hour laboratory periods. Fee \$0.60.

C. C. Ruth

FC 312. Crop Inspection. The inspection, grading, and valuation of cereals, forage, potatoes, beans, seeds, stock feeds, and miscellaneous agricultural commodities according to Federal, state, and other adopted standards; theory and practice of grade fixation and application. A course for people buying or selling agricultural commodities, grain supervisors, samplers, inspectors, warehousemen, millers, and others.

Prerequisites: FC 100, 311, 314; Ch 247, 224, 251. Required in Farm Crops; elective to others; junior year; second term; 5 credits; 2 lectures; 3 two-hour laboratory periods. Fee \$0.75.

C. C. Ruth

FC 313. Crop Judging. Laboratory work in varietal identification and judging of seed, cereal, forage, and fiber crops. Especially suited to students desiring to enter commercial work in buying and selling crops or to become expert crop judges. Teams for judging contests will be selected from students taking this course.

Prerequisites: FC 100, 311. Elective; junior year; third term; 3 credits; 3 two-hour laboratory periods.

G. R. Hyslop, E. N. Bressman, C. C. Ruth

FC 314. Potato Growing. Potato production; improvement; storage; cost; marketing; distribution; uses; experimental work; varietal studies and identification; judging and scoring.

Prerequisites: FC 100; Bot 101, 102. Required in Farm Crops; elective to others; junior or senior year; second term; 2 credits; 1 recitation; 1 two-hour laboratory period. Fee \$0.50.

G. R. Hyslop

FC 331. Forage Crops and Root Crops. The production, handling, storage, marketing, and uses of forage; reseeding and care of range; development and maintenance of pasture; silage and hay making; soiling crop rotations; root-crop production; cost comparison of different crops.

Prerequisite: FC 100. Required in Farm Crops; elective to others; junior year; third term; 3 credits; 3 lectures. Fee \$0.30.

G. R. Hyslop

FC 351. Seed Testing. A study in seed identification and germination; seed legislation; standard methods of seed testing; seed grades and standards. A course for students preparing for private, state or Federal seed-testing work. Men and women having a good knowledge of systematic Botany and some knowledge of seed production may take this course.

Elective; junior or senior year; second term; 2 credits; 2 two-hour laboratory periods. Fee \$0.75.

C. C. Ruth

FC 361. Weed Eradication. Lectures and reference work on weed types and their habits of growth; weed legislation; practical methods of prevention, control, and eradication; special attention to noxious, persistent, perennial, and poisonous weeds of ranch and range.

Elective; any year; third term; 2 credits; 2 lectures.

C. C. Ruth

FC 414, 415, 416. Advanced Crop Work. Lectures or laboratory work, or both, to groups of students desiring additional work along special lines of crop production not treated fully in other courses, or for students desiring to carry on advanced work or investigation beyond that outlined in undergraduate courses. Individual students are assigned to some practical problem involving experimental or research work and the preparation of a thesis.

Elective; senior year; three terms; 3 to 5 credits each term. Fee to be arranged.

G. R. Hyslop, E. N. Bressman, C. C. Ruth

FC 432. Seed Production. Principles and special methods of production, distribution, and use of seed crops of grasses, alfalfa, clover, and other forage legumes; field beans, horse beans, soybeans, peas, and other food legumes, and other special seed crops. Seed inspection, seed certification, and seed legislation.

Prerequisites: FC 100, 311, 321. Required in Farm Crops; elective to others; senior year; first term; 3 credits; 2 lectures; 1 two-hour laboratory period. Fee \$0.60. *G. R. Hyslop*

FC 442. Crop Improvement. Practical improvement of farm crops as to quality and yield; field selection; variety testing; head, hill, and ear-to-row methods; multiplication; pure-seed production; hybridization and fundamental plant-breeding laws applicable to practical crop improvement; laboratory and field work.

Prerequisites: FC 100; Bot 101, 102; ZP 351. Required in Farm Crops; elective to others; senior year; first term; 5 credits; 4 lectures; 1 two-hour laboratory period. Fee \$0.75. *E. N. Bressman*

FC 443. Advanced Crop Breeding. An advanced course dealing with the theory and technique of breeding field crops; transmission of characters; hybridization; variability and its measurement; behavior of characters of specific crops. This course is especially for students expecting to make a business of seed production and improvement and for those wishing to enter Federal or experiment station work in crops.

Prerequisites: FC 100, 311, 442; ZP 351. Elective; senior year; second term; 3 credits; 3 recitations. Fee \$0.35. *E. N. Bressman*

FC 451. Crop Efficiency. The production, storage, and marketing of farm crops; comparison of methods leading to cheaper and more efficient production; analysis of net results; crop adaptability and its relation to substitutes and competing markets; relation of preparatory methods to returns; cropping systems and crop rotations; crop specialization; amendments affecting yield, quality, and profits of specific crops; crop storage and conditioning; grade and standard fixation; marketing of farm crops; export and import regulations; crop statistics, their value and use; disposal of crop by-products; other problems affecting successful production.

Prerequisites: FC 100, 311, 432; Ch 247, 224, 251; ES 362. Required in Farm Crops; senior year; third term; 5 credits; 5 lectures. Fee \$0.35. *G. R. Hyslop*

FC 691, 692, 693. Thesis and Graduate Study. Candidates for advanced degrees majoring in Farm Crops are expected to complete from 24 to 32 credits of work on some specific problem of a

practical nature, requiring careful research work. Results of laboratory and field work, together with a study of the literature of the subject must be embodied in a suitable thesis.

Elective; graduate year; three terms; credits and fees to be arranged.

G. R. Hyslop, E. N. Bressman, C. C. Ruth

FARM MANAGEMENT

Farm Management deals with the organization, equipment, and operation of the farm as a business enterprise. Its aim is to correlate and synchronize the operations in the various phases of production on the farm in such a way as to result in a smoothly-running, efficient plant from which maximum returns may be obtained. The courses in Farm Management are designed to give the student a broad, well-rounded training in all the phases of Agriculture that will prepare him for successful production, with emphasis laid upon those studies which will fit him best for successful management of the farm. They also prepare students for professional work as farm managers, county agriculturists, extension specialists, farm appraisers, instructional and investigational workers, etc.

Equipment. The Farm Management laboratory and seminar room are provided with drafting tables and instruments, surveying instruments, original data and record sheets, lantern slides and charts, and a complete periodical and bulletin reference library. Investigational work carried on in many different parts of the state offers the advanced student excellent opportunities for field work.

COURSES

FMg 302. Farm Management. Major factors affecting the labor income; types of farming; selection and purchase of the farm; capital investment and distribution; use of credit; quality and diversity of business; farm leases and rental methods; man and horse labor efficiency; farm equipment costs and duty; farm and farmstead layout; cropping systems and crop rotations; maintenance of soil fertility; cost of production; use of farm records and accounts; marketing in relation to farm management; typical successful and unsuccessful farms; getting started in the farming business. Short field trips. Advanced Farm Management may be taken accompanying this course.

Required in Agriculture; elective to others; junior year; first or second term; 4 credits; 3 lectures; 1 recitation; 1 two-hour laboratory period. Fee \$1.00.

H. D. Scudder, C. Wilkes

FMg 303. **Farm Management.** A continuation of FMg 302 in which the minor factors in successful farm management are discussed.

Prerequisite: FMg 302. Required in Farm Management; elective to others; junior year; second term; 3 credits; 2 lectures; 1 two-hour laboratory period. Fee \$0.50. *H. D. Scudder, C. Wilkes*

FMg 304. **Farm Management Field Course.** Practical application of farm management principles through direct field study and analysis of successful farms in the state; training in regular farm-management survey work. In the summer of the junior year students registered in this course, accompanied by the instructor, spend four or five weeks in the field in different sections of the state, devoting about one week to each section. Camp equipment is provided and field camp maintained throughout the period, the student paying only his living and traveling expenses.

Prerequisite: FMg 302. Elective; junior year; summer term; 8 credits; field work. *H. D. Scudder, C. Wilkes*

FMg 411. **Farm Organization.** Application of farm management principles to the organization of the individual farm; methods of measuring the efficiency of any given farm; organizing a farm business; standards for farm planning; efficiency practices in production and operation; planning production programs, cropping systems, and fertility balances; labor programs; livestock, machinery, and building equipment; methods of increasing productive business; methods of financing, etc. Field trips. This course gives preparation for the actual field problems undertaken in Advanced Farm Management.

Prerequisite: FMg 302. Required in Farm Management; elective to others; junior year; third term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$0.50. *H. D. Scudder, C. Wilkes*

FMg 412. **Semi-arid Farm Management.** The farm-management problems of the dry farmer and irrigation farmer; preparation of management plans dealing with forms of production, profitable enterprises, fertility rotations, equipment, labor distribution, marketing, etc., as adapted to semi-arid conditions; when possible, a field excursion into the dry farming and irrigated sections of Oregon for farm survey work.

Prerequisite: FMg 302. Elective; senior or graduate year; second term; 2 credits; 2 lectures. *H. D. Scudder*

FMg 422, 423. **Farm Management Seminar.** Senior and graduate students majoring in Farm Management meet together in seminar work and juniors are required to attend open meetings as

listeners. The class constitutes the students' technical association in Farm Management. Phases of problems of research character are presented by the senior and graduate students working under the supervision of the instructor. Discussion of investigational methods and results; inquiry into opportunity and requirements for professional and practical work in Farm Management; presentation of management methods by successful farmers in the state, etc. Each year a three-day field trip is taken to successful farms.

Required in Farm Management; senior or graduate year; second and third terms; 1 credit each term; fortnightly meetings.

H. D. Scudder

FMg 431. Cost of Production. Methods of obtaining and determining costs of agricultural products, including the survey method; assembling, tabulation, analysis, and interpretation of cost data; cost record forms for different types of farms and enterprises and for cost surveys.

Prerequisite: FMg 302. Elective; senior or graduate year; first term; 2 credits; 2 lectures.

FMg 433. Enterprise Costs and Profits. A survey of the whole field of farm enterprises, particularly those of the Northwest and Pacific Coast, to give the student a needed basis for the correct selection of enterprises in different regions. The importance of each enterprise; causes of failure; size; capital, labor and maintenance requirements; production possibilities and markets; costs, prices, and profits; analyses of new or questionable enterprises; field study of major enterprises.

Prerequisite: FMg 302. Required in Farm Management; elective to others; senior or graduate year; third term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$0.50.

H. D. Scudder, C. Wilkes

FMg 441, 442, 443. Advanced Farm Management. Field work on individual problems such as preparation of detailed organization and management plans for specific farms; efficiency testing of groups of farms; field studies and costs and profits of specific farm enterprises; field study of specific farm practices and their efficiency; studies in equipment and building improvement; farm management factor studies, etc., directed and reviewed through weekly round-table discussions. Courses 442, 443, are required in Farm Management.

Prerequisite: FMg 302. Elective; senior or graduate year; three terms; 3 to 5 credits each term; all laboratory and field work. Fee \$1.00 each term.

H. D. Scudder, C. Wilkes

FMg 452. Land Economics. Land resources of the state and the United States; characteristics and classification of lands and

their economic utilization; land values, changes in value, and relation between rental and sale values; methods of land appraisal; forms of land tenure, conditions determining, and effects; methods and costs in land clearing and other reclamation; methods of land settlement; policies in this and other countries in land development, conservation, and settlement.

Prerequisite: FMg 302. Required in Farm Management; elective to others; senior or graduate year; second term; 3 credits; 3 lectures.

H. D. Scudder

FMg 463. Accredited Farm Work. Senior or graduate students who have taken the regular four-year major in Farm Management or its equivalent and who have previous good records of practical experience in farming and the necessary personal qualifications as to character, industry, etc., have opportunity in this course as workmen on "accredited farms"—farms operated by progressive and successful farmers—both for actual experience and to study the management of these farms, making written reports, and where advisable, preparing reorganization plans. Work is inspected by the instructor and reported upon by the farm owner. College credit given the student depends upon extent and quality of practical work and written reports.

Prerequisite: FMg 302. Elective; senior or graduate year; 8 to 16 credits.

H. D. Scudder

FMg 601, 602, 603. Thesis and Graduate Study. Under this head all graduate work in Farm Management is registered. Graduate work in this field may be along either of two lines.

A. Research. For the student who wishes to prepare himself for investigational and instructional or extension work in Farm Management. With the development of Farm Management throughout the country as a distinct science or branch of Agriculture, many opportunities are opening up for men in instructional or investigational or extension work in both state and Federal service. Problems of wide diversity and great practical interest offer attractive thesis subjects. The minor courses required in connection with research problems are taken in residence one or more terms and the major work in residence or in the field.

B. Practical Management. For the student who wishes to prepare himself more thoroughly as a farm manager, a sufficient period registered in the course FMg 463, Accredited Farm Work, combined with several terms' work in residence, is suggested.

Elective; graduate year; three terms; credits to be arranged.

H. D. Scudder

HORTICULTURE

The work in Horticulture includes instruction in Pomology, Vegetable Gardening, Floriculture, Landscape Gardening, and Horticultural Products. In these courses the student is first thoroughly grounded in the fundamentals, and is then allowed to specialize as he desires. He thus may fit himself for experiment station or government work or prepare for the many lines of horticultural business.

The courses consist of lectures, reference reading, field exercises, and laboratory work. Much stress is placed upon the practical phases of all the work. In all courses horticultural truths are illustrated by practice, whenever possible. Students are given field and laboratory exercises in all such operations as planting, seeding, budding, grafting, cultivating, thinning, pruning, harvesting, and spraying.

Equipment. The Horticultural wing of Agriculture Hall, Horticultural Products Building, the greenhouses, extensive orchards and gardens, the large campus containing good plant material, an ammonia-gas cold storage plant, and a very good library are at the service of the department. The laboratories are well equipped for giving instruction in spraying, plant propagation, and fruit packing, vegetable grading and crating, and systematic pomology. There are large lecture rooms, a drafting room, photography rooms, and a Horticultural Museum.

The equipment of the Horticultural Products Building is described on page 59.

In addition to the extensive orchards and gardens of the College, the region is well provided with orchards, canneries, etc., which can be used in the laboratory work.

The department of Horticulture is well equipped for research work. The laboratories, the greenhouses, the experimental plots, and an excellent research library of scientific books and periodicals, facilitate effective investigation in the field of Horticulture.

COURSES

NOTE: Excepting Hrt 100, the courses in Horticulture are arranged in numerical order within the following groups: Pomology, Vegetable Gardening, Landscape Gardening, Floriculture, Horticultural Products, Research.

Hrt 100. Elements of Horticulture. This course is designed to give a student enough training in horticulture to enable him to care for the home orchard and garden as well as to understand some of the fundamentals of commercial orcharding and trucking. The orchard; budding; grafting; purchasing of nursery stock; planting the orchard; tillage; spraying; intercropping; pruning; planting and care of the garden; methods of vegetable growing.

Required in Agriculture; freshman year; any term; 5 credits; 2 lectures; 2 recitations; 2 two-hour laboratory periods. Fee \$1.00.
W. S. Brown, L. P. Wilcox, and assistants

POMOLOGY

Hrt 311. **Practical Pomology.** A continuation of Hrt 100. Principles and practices of fruit growing; frost fighting; thinning; fertilizers; pollination; economics of fruit-farm management, etc.

Prerequisite: Hrt 100. Required in Pomology; junior year; first term; 4 credits; 2 lectures; 2 recitations; 1 three-hour laboratory period. Fee \$1.50. *C. E. Schuster, L. P. Wilcox*

Hrt 312. **Sub-tropical Pomology.** This course takes up in detail the problems concerning the growing and marketing of such sub-tropical fruits as oranges, figs, olives, pineapples, etc.

Prerequisite: Hrt 100. Elective in Horticulture; junior or senior year; first term; 3 credits; 2 lectures; 1 recitation.

C. E. Schuster

Hrt 313. **Pruning and Spraying.** Thorough training in the fundamental principles underlying pruning, including bud studies, tree building, maintaining vigor of the tree, rejuvenation and the like. About one-third of the term is devoted to spraying machinery, spraying accessories, technique, and practical methods.

Required in Pomology; junior year; second term; 5 credits; 3 lectures; 2 recitations; 1 three-hour laboratory period.

*W. S. Brown, L. P. Wilcox, H. P. Barss, D. C. Mote,
W. J. Gilmore, R. Lothrop.*

Hrt 361. **History and Literature of Horticulture.** Brief study of the history of horticulture; systematic survey of the literature of horticulture, acquainting the student with the various sources of horticultural knowledge.

Required in Pomology; junior year; third term; 3 credits; 2 lectures; 2 recitations.

H. Hartman

Hrt 410. **Commercial Pomology.** The problems of handling fruit, including the picking, grading, and packing of fruits; study of the problems of transportation, storage, distribution, and marketing; planning of buildings for packing and storing of fruits.

Required in Pomology; senior year; second term; 5 credits; 3 lectures; 2 recitations; 1 two-hour laboratory period. Fee \$0.50.

H. Hartman

Hrt 412. **Systematic Pomology.** Principles underlying pomological nomenclature, variety and species, description, classification and identification of the more important fruit groups and their interrelationship.

Required in Pomology; senior year; first term; 5 credits; 2 recitations; 4 two-hour laboratory periods. Fee \$3.00.

H. Hartman

Hrt 415. Small Fruits and Grapes. Problems connected with the soils and slopes, pruning, training, harvesting, packing, and marketing of such small fruits as the strawberry, currant, gooseberry, raspberry, blackberry, loganberry, and cranberry; together with American and European grapes.

Elective; junior or senior year; second term; 4 credits; 2 lectures; 2 recitations.

L. P. Wilcox

Hrt 416. Nut Culture. Methods of growing, harvesting, curing and marketing such nut crops as the walnut, filbert, almond, and pecan. Detailed laboratory study of the leading varieties of these nuts.

Elective; junior or senior year; second term; 2 credits; 1 lecture; 1 two-hour lecture-laboratory period. Fee \$1.00.

C. E. Schuster

Hrt 417. Orchard Practices and Management. Trips are taken to fruit farms near Corvallis and other places in the state. Studies made of practices in pruning, spraying, cultivation, marketing, etc. The management of fruit farms is gone into carefully. Maps and plans for fruit farms are made. Students registered only by appointment with the head of the department. Schedule by arrangement in four-hour periods.

Prerequisites: Hrt 311, 313. Elective; senior year; third term; 3 credits; 1 recitation; 1 four-hour laboratory period. Fee according to cost of trips.

W. S. Brown

Hrt 418. Applied Plant Genetics. History and development of plant breeding with horticultural plants; methods used by breeders; clonal selection; varieties of plants; evolution and development of species and varieties of horticultural importance; selection; hybridization; graft hybrids; bud selection; disease resistance, etc.

Prerequisite: ZP 351. Elective; junior or senior year; third term; three credits; 2 lectures; 1 recitation; 1 two-hour laboratory period. Fee \$1.50.

H. Hartman

Hrt 481, 482, 483. Seminar. Courses for senior and graduate students in Horticulture. Study is made of some of the advanced problems. Articles from the leading magazines on horticultural subjects, as well as experiment station and Government publications, are reviewed.

Required in Horticulture; senior year; three terms; 1 credit each term; 1 recitation.

W. S. Brown

Hrt 619. **Advanced Plant Genetics.** Special problems in plant breeding for graduate students.

Prerequisites: ZP 351, Hrt 418 or full equivalents. Elective; graduate year; any term; credits to be arranged. *E. M. Harvey*

Hrt 621, 622, 623. **Thesis and Graduate Study.** Special problems in Pomology for graduate students.

Elective; graduate year; three terms; 3 credits each term. To be arranged. *H. Hartman*

Hrt 625. **Advanced Systematic Pomology.** A complete review of Systematic Pomology, including description, nomenclature, classification, and identification, together with review and abstracting of literature of the subject.

Elective; first term; hours and credits to be arranged. *H. Hartman*

VEGETABLE GARDENING

Hrt 221. **Vegetable Growing.** Fundamental study of methods of vegetable growing; planting and care of a vegetable garden as an integral part of every farm home; preparation for advanced courses in vegetable growing.

Required in Vegetable Gardening; optional in Agriculture; sophomore year; third term; 3 credits; 1 lecture; 1 recitation; 1 two-hour laboratory period. *A. G. Bouquet*

Hrt 321. **Vegetable Seed Production.** The business of seed production is becoming yearly more important. The work offered in this course is designed both to enable the student to understand and practice methods used in seed production, and to acquaint him with the manner of improving for himself seed strains of vegetables grown for market or home use. Laboratory work consists of field practice in selection of stocks, harvesting, threshing, and cleaning seed, seed testing, etc.

Required in Vegetable Gardening; junior year; first term; 3 credits; 1 lecture; 1 recitation; 1 two-hour laboratory period. *A. G. Bouquet*

Hrt 322. **Principles of Vegetable Gardening.** A continuation of Hrt 221. Problems of growers in field management of a commercial vegetable garden, including such subjects as vegetable soils, production of plants, distribution of crops, succession of crops, manures and fertilizers, methods of irrigation, pest control, etc.

Required in Vegetable Gardening; junior year; second term; 3 credits; 2 recitations; 1 two-hour laboratory period.

A. G. Bouquet

Hrt 323. **Practical Vegetable Gardening.** A continuation of Hrt 322. Study of methods used in the commercial production of vegetables for market; field and greenhouse work with lectures thoroughly to acquaint the student with proper methods and management; inspection of commercial testing grounds; trips to vegetable farms.

Required in Vegetable Gardening; junior year; third term; 3 credits; 2 recitations; 1 two-hour laboratory period.

A. G. Bouquet

Hrt 421, 422, 423. **Vegetable Forcing.** This work extends through the three terms of the college year, thus giving the student opportunity to observe fall, winter, and spring conditions as they relate to crops under glass. Vegetable greenhouse types, soils, fertilizing materials, soil cropping, sterilization methods, frame practice and greenhouse irrigation are studied. Crop production and marketing studies include leaf lettuce, spinach, cauliflower, French endive, rhubarb, etc. Spring term instruction deals largely with the growing and marketing of tomatoes and cucumbers and the production of young vegetable plants.

Required in Vegetable Gardening; senior year; three terms; 2 credits each term; 1 recitation; 1 two-hour laboratory period.

A. G. Bouquet

Hrt 424. **Systematic Olericulture.** Descriptions, nomenclature, and classifications of vegetables; a sufficient number of varieties of each vegetable studied so that the student may become acquainted with the more important groups of horticultural varieties; exercises in displaying and judging vegetables; assigned readings.

Required in Vegetable Gardening; senior year; first term; 2 credits; 2 two-hour laboratory periods.

A. G. Bouquet

Hrt 425. **Vegetable Marketing.** Principles and commercial practices of field harvesting, grading, and packing of vegetables; methods of marketing. Lectures, field work, farm and market visits; assigned readings.

Required in Vegetable Gardening; senior year; first term; 3 credits; 2 recitations; 1 two-hour laboratory period.

Hrt 426. **Vegetable Marketing.** Continuation of Hrt 425. Car loading, mixed cars, transportation, and distribution of truck crops, such as onions, onion sets, cabbage, cauliflower, broccoli, melons,

tomatoes. Lectures, field work, in loading and observation of car loads; assigned readings.

Required in Vegetable Gardening; senior year; second term; 3 credits; 2 recitations; 1 two-hour laboratory period.

Hrt 427. Commercial Truck Gardening. Commercial vegetable gardening, principally as related to methods of production for the general market and for canneries and dehydrators. A general review of commercial vegetable gardening problems. Assigned readings.

Required in Vegetable Gardening; senior year; third term; 3 credits; 2 recitations; 1 two-hour laboratory period.

LANDSCAPE GARDENING

Hrt 231. Landscape Gardening. This course is designed to fit the needs of all students. Definite principles controlling layout and organization of different classes of property are developed. Enough drafting is required so that the student can express himself in a satisfactory manner. Study is made of problems in improvement work on home grounds, rural or urban, private estates, and small parks.

Required in Landscape Gardening; optional in Agriculture; sophomore year; first term; 3 credits; 2 two-hour drafting periods; 2 lectures; 1 recitation. *A. L. Peck*

Hrt 331, 332, 333. Plant Materials. This work is intended to familiarize the student with trees, shrubs, vines, and perennials; their peculiar habits of growth, requirements, and care. Special attention is given to foliage, color, form, adaptation, hardiness, and effects when grouped. Students are advised to take Hrt 231 as a preliminary.

Required in Landscape Gardening; junior year; three terms; 3 credits each term; 3 two-hour laboratory periods. *A. L. Peck*

Hrt 337. History and Literature of Landscape Gardening. Designed to give the student a good idea of the development of the art, and to bring him in touch with the literature, past and current, that is related to the subject.

Required in Landscape Gardening; junior year; first term; 3 credits; 3 recitations. *A. L. Peck*

Hrt 431. Theory and Design. A study of the best works of prominent landscape architects, together with a wide range of collateral reading. Private estates, public parks, and playgrounds, boulevards, and cemeteries are carefully studied. Reports, such as those of park boards and landscape architects, are studied.

Prerequisites: Hrt 231, 331, 332, 333. Required in Landscape Gardening; senior year; first term; 4 credits; 1 recitation; 3 three-hour laboratory periods. *A. L. Peck*

Hrt 432. **Theory and Design.** A continuation of Hrt 431, in which a large portion of the time is devoted to preparation of planting plans. Outside time is required for collateral reading.

Prerequisite: Hrt 431. Required in Landscape Gardening; senior year; second term; 4 credits; 12 hours laboratory work. *A. L. Peck*

Hrt 434, 435. **Field Practice.** Courses in practical problems brought in from the field. The student makes surveys, does the engineering work incidental to the solving of the problem, makes general plans, planting plans, grading plans, details, etc.

Prerequisites: Hrt 231, 331, 332, 333. Required in Landscape Gardening; senior year; first and third terms; 4 credits each term; 12 hours laboratory work. *A. L. Peck*

Hrt 437. **Town Planning.** The underlying ideas of municipal, town, and village improvement; literature and reports studied; town problems discussed; methods of procedure in town improvement worked out.

Required in Landscape Gardening; senior year; third term; 4 credits; 1 recitation; 9 hours laboratory work.

FLORICULTURE

Hrt 241. **Plant Propagation and Greenhouse Practice.** This course aims to meet the needs of students who expect to be engaged in agricultural research requiring an understanding of greenhouse practices in the handling of soils, water, sunlight, heat, and ventilation. Methods of propagating plant life are studied. Students are required to grow their own stock in the houses and to care for it throughout the term. Limited to twenty-five students.

Required in Landscape Gardening (freshman year); elective to others (sophomore or junior year); second term; 3 credits; 1 lecture; 1 recitation; 2 two-hour practicums. Fee \$1.50. *A. L. Peck*

Hrt 341. **Greenhouse Construction.** A course especially for students specializing in Floriculture and Vegetable Gardening. The problems connected with the building of greenhouses, hotbeds, and cold-frames; selection of materials; the various systems of heating and ventilating; value of the various types of buildings; lectures and laboratory exercises in greenhouses and drafting room.

Elective; junior year; second term; 4 credits; 1 lecture; 3 three-hour laboratory periods.

Hrt 441, 442, 443. **Greenhouse Crops.** Actual work in the greenhouse. Propagation; culture; soils; ventilation; watering; heating; as wide a range of experience as possible in growing of plants used in the florist trade.

Prerequisite: Hrt 241. Elective; senior year; three terms; 3 credits each term; 9 hours laboratory work. *A. L. Peck*

HORTICULTURAL PRODUCTS

The work in Horticultural Products is designed to fit the student to enter fields of commercial canning, dehydration, jam, jelly, and juice manufacture and, in addition, to prepare him for research work along these lines. All laboratory work is conducted on a commercial scale, and the student is trained to operate and repair machinery used in all manufacturing work.

Instruction in canning embraces grading, blanching, siruping, exhausting, sealing, sterilizing (both in open bath and retort), labeling, and storage. Emphasis is given the making of sirups and brines. In dehydration, instruction covers the drying of prunes, pears, apples, and other fruits, and vegetables. Students have opportunity to operate both the farm drier and the commercial dehydrating tunnel, where conditions are kept under constant control. Special opportunity is offered also to those wishing work on problems of by-products manufacture.

Students expecting to specialize in Horticultural Products are requested to take courses in Canning Bacteriology, Horticultural Products Chemistry, Pomology, Business Organization and Management, Cost Accounting, and Seminar.

Hrt 351. **Principles of Canning Fruits.** This course is designed to teach by lectures, recitations, and laboratory exercises the fundamental principles of canning fruits, method of preparation, grading, siruping, exhausting, sealing, cooking, cooling, and storing. It covers a working knowledge of methods used in commercial canning.

Required in Horticultural Products; junior year; first term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *J. C. Bell*

Hrt 352. **Principles of Canning Vegetables.** Continuation of Hrt 351.

Required in Horticultural Products; junior year; second term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *J. C. Bell*

Hrt 353. **The Canning Plant and Its Equipment.** The purpose of this course is to study the canning plant, its location, general

plan of construction, equipment, and operation. Students are given training in designing plants and estimating costs. Laboratory work covers the construction and adjustment of canning machinery. Field trips to canneries to study their construction.

Required in Horticultural Products; junior year; third term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *J. C. Bell*

Hrt 363. Food Products. Commercial methods followed in the manufacture of such food stuffs as fruit and vegetable by-products, spices, condiments, flavoring extracts, sirups, leavening agents, animal foods; the use of sugars, vegetable cooking oils, flours, and cereals.

Elective; junior or senior year; third term; 2 credits; 1 lecture; 1 recitation. *J. C. Bell*

Hrt 371. Dehydration of Fruits and Vegetables. This course is especially for students majoring in Horticulture. Actual drying of fruits and vegetables is done, along with the study of the common types of driers and principles of dehydration.

Required in Horticultural Products; junior year; first term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *E. H. Wiegand*

Hrt 381. Pickles, Relishes, and Condiments. This course is offered to meet a demand for training in the methods of preparing sour, sweet, and dill cucumber pickles, and the pickling of onions, watermelon rind, carrots, beets, crab-apples, tomatoes, mixed pickles, and relishes. It aims to teach the principles of pickling by salting and vinegar, and reasons for pickles sometimes going bad.

Required in Horticultural Products; junior year; first term; 3 credits. Fee \$5.00.

Hrt 451. Fruit Juice and Vinegar Manufacture. Practical and scientific work in the handling of fruit juices; problems of filtration, sterilization, and bottling.

Required in Horticultural Products; senior year; first term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *E. H. Wiegand, J. C. Bell*

Hrt 462. Commercial Jam and Jelly Manufacture. Practical and scientific manufacture of jams and jellies.

Required in Horticultural Products; senior year; second term; 3 credits; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *J. C. Bell*

Hrt 472, 473. Preserves, Glacéd Fruits, and Candied Fruits. Continuation of Hrt 451. Manufacture of preserves, marmalades, conserves, maraschino cherries, glacéd fruits, and candied fruits.

Required in Horticultural Products; senior year; second and third terms; 3 credits each term; 1 lecture; 1 recitation; 1 four-hour laboratory period. Fee \$5.00. *E. H. Wiegand, J. C. Bell*

Hrt 487, 488, 489. **Special Problems.** Special study of some phase of fruit and vegetable preservation, as selected by the student, such as dehydration, pickle manufacture, canning and preserving certain products, etc.

Elective; senior year; three terms; credits, hours, and fees to be arranged. *E. H. Wiegand*

RESEARCH

Hrt 491, 492, 493. **Investigative Work for Seniors in Horticulture.** This work is offered for those seniors who are contemplating following college, experiment station, or Government work as a life career, and for those who desire practice in research technique. Problems are assigned which give experience in the laboratory, greenhouse, field, and library.

Elective; senior year; three terms; 3 credits each term; 2 lectures. *E. M. Harvey*

Hrt 691, 692, 693. **Thesis and Graduate Study.** For graduate students only. Problems in Pomology, Vegetable Gardening, Landscape Gardening, Floriculture, Plant Breeding, as selected by student.

Elective; graduate year; three terms; 2 to 8 credits each term. *E. M. Harvey*

Hrt 694, 695. **Methods of Research.** Conducted as a research round table, these courses give drill in making of briefs and outlines of research problems, methods of procedure in conducting investigative work, processes of reasoning, weighing of evidence, and the preparation of bulletins and reports. Research problems being studied by the department of Horticulture are taken up. Close study is made of research work presented in bulletins from other institutions.

Elective; senior year; first and second terms; 2 credits each term; 2 lectures. *E. M. Harvey*

POULTRY HUSBANDRY

Poultry keeping is rapidly growing in importance as a definite part of every well-regulated system of diversified farming, and offers opportunity for profit-making as a specialized business. The climate of Oregon is particularly adapted to the successful breeding and raising of poultry.

Equipment. The equipment includes two poultry plants, one of twenty-five acres, the other a five-acre tract. The two-story Poultry Building has laboratories for incubation, judging, killing, egg handling, and carpentry, equipped with appliances necessary for practical poultry keeping. Twenty different makes of incubators, including a mammoth machine, are available for student practice in incubation. There are colony poultry houses, three different types of commercial houses, and hatching and brood coops of various styles. Large flocks of Barred Plymouth Rocks and White Leghorns are available for study, and there are pens of several other of the more common breeds and varieties which are used for student study and judging practice. There are also sets of charts, lantern slides, motion pictures, and photographs, illustrating breeds of fowls, types of poultry houses, and equipment.

COURSES

PH 201. Practical Poultry Keeping. A brief course dealing with practical application of the principles of Poultry Husbandry to general farm conditions. An introductory course for those intending to specialize in this field, recommended also for those who plan to teach agriculture or wish a single, elementary course in Poultry Husbandry.

Optional in Agriculture; sophomore year; any term; 3 credits; 2 lectures; 1 recitation; 1 two-hour laboratory period. Fee \$2.50.

A. G. Lunn

VM 309. Anatomy of the Fowl. Required in Poultry Husbandry; second term; junior year; 3 credits; 2 lectures; 2 two-hour laboratory periods. (See courses in Veterinary Medicine.)

PH 311. Poultry Breeding, Breeds, and Judging. A study of breeds of poultry, their history and classification; principles and methods of breeding for different purposes; laboratory work in identification and judging from fancy and utility standpoints.

Prerequisite: PH 201. Required in Poultry Husbandry; junior year; first term; 4 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$1.00. Deposit \$1.00.

F. E. Fox

PH 321. Incubation and Brooding. A study of the principles and practices involved in natural and artificial incubation and brooding; study of the egg and its development; laboratory work in actual running of incubators and brooders; opportunity given when possible for students to work out some definite problem.

Prerequisite: PH 201. Required in Poultry Husbandry; junior year; second term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$1.50. Deposit \$1.00.

F. E. Fox

PH 331. **Poultry-house Design and Construction.** A study of the principles of poultry-house designing; estimating the cost of buildings; studying building plans; practice in erecting, remodeling, and making appliances; excursions to neighboring farms.

Prerequisite: PH 201. Required in Poultry Husbandry; junior year; third term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00. Deposit \$1.00. *F. E. Fox*

VM 351. **Poultry Diseases.** Required in Poultry Husbandry; junior year; third term; 3 credits; 3 recitations; 1 two-hour laboratory period. (See courses in Veterinary Medicine.)

PH 441. **Poultry Feeding.** A study of feeds suitable for poultry; principles and practice of feeding breeding stock, feeding for egg production, and fattening for market; feeding young and growing chicks; feeding appliances; the compounding of rations; actual practice in feeding a flock of hens.

Prerequisite: PH 201. Required in Poultry Husbandry; senior year; first term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$1.00. Deposit \$1.00. *F. E. Fox*

PH 451. **Marketing Poultry Products.** Preparation of poultry and eggs for market; methods of storage and preservation; methods of marketing; laboratory work in killing, picking, grading, packing, and shipping poultry; testing, grading, packing, and storing eggs.

Prerequisite: PH 201. Required in Poultry Husbandry; senior year; second term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00. Deposit \$1.00. *F. E. Fox*

PH 463. **Poultry Plant Management.** Selection of the location, layout, and arrangement of buildings; study of records. Each student works out complete plans for the layout and management of a commercial poultry enterprise.

Prerequisites: PH 321, 331, 441, 451. Required in Poultry Husbandry; senior year; third term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$1.00. Deposit \$1.00. *F. E. Fox*

PH 481, 482, 483. **Seminar.** Discussion of Poultry literature and current problems of interest to the advanced student, including critical examination of research methods relating to poultry work. Frequent written reports are required.

Required in Poultry Husbandry; senior year; three terms; 1 credit each term; 1 meeting. *A. G. Lunn*

PH 484, 485, 486. **Departmental Management.** For seniors majoring in Poultry Husbandry. Practical work in and about the poultry department, so arranged as to give the student practice

and experience in college poultry plant management. Hours to be arranged with head of department.

Required in Poultry Husbandry; senior year; three terms; 3 credits each term; 3 three-hour laboratory periods. *A. G. Lunn*

PH 601, 602, 603. **Graduate Work.** Students registering for graduate work in Poultry Husbandry may elect, with the approval of the head of the department, any branch of the subject upon which they desire to do their graduate work. With the great amount of data collected during the past fifteen years the department offers special opportunity for research work, particularly along the lines of breeding for egg production.

Elective; graduate year; three terms; credits to be arranged. *A. G. Lunn*

SOILS

The work in Soils includes soil physics, soil drainage, irrigation farming, dry farming, soil fertility, soil surveying, soil biology and soil management. The purpose of the courses in Soils is to give the student thorough training in this important phase of agriculture, making him competent to manage a farm or preparing him for positions in 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 state and Federal aid to reclamation, there will be a greater demand for men who have a knowledge of how most successfully and economically to use water which the engineer's canals and reservoirs provide. These men must know the best time, amount, and method of irrigation, and the effects of irrigation upon soils and crops. They should also know the relations between soils, soil waters, and drainage, and understand how to locate and construct drains and to treat or fertilize the soil so as to secure the highest possible efficiency for each unit of tiling employed.

Equipment. The Soils laboratories are equipped with apparatus for complete study of physical and chemical properties of soils and problems of soil management. Ample desk room, supplied with running water, gas, compressed air, and electricity, is available. Electric centrifuges and shakers, electric bridge for alkali testing, electric air baths, analytic and torsion balances, microscopes, blast lamps, aspirators, percolators, capillary tubes, mulch cylinders, soil sieves, scales, solution balance, compression filters, soil sampling tubes, moisture equivalent centrifuge, furnace, hoods, etc., form a part of the equipment for the work in Soils. 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 benches, soil-grinding and sifting machinery, and ample 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 fitted with desks, ovens, etc., afford opportunities for studies of the movement and retention of irrigation water in soil, the effects of irrigation upon soils and crops, the effect of tile drainage upon soils of different types, their rate of drainage, etc. On the College farm the students build weirs, measure water, lay out distribution systems, make cement pipes for laterals, and test pumping machinery. On the drainage plots, the rate of discharge is measured and the effects of drains and soil conditions on water-table are studied. The Exhibit Room is equipped with cases and racks for displays of soil sample collections; subsoils, hard-pans, soil analyses, soil colors, soil drainage and irrigation exhibits, etc. A well-stocked reference library is available. The Experiment Station farms at Corvallis and in other parts of the state, together with the cooperative trials in different counties, offer opportunity for field study of soil problems.

Research. The department of Soils is well equipped for offering research work. The experiment fields, soil tanks, laboratories, and library, and the plans and methods used in soil, irrigation, and drainage investigations offer valuable opportunities to graduate students. See courses Sls 601, 602, 603.

COURSES

Sls 201, 202. **Soils.** Origin, formation, and classification of soils; study of the physical properties of soil moisture, heat, and air; effects of tillage, drainage, and irrigation; plant foods and soil fertility; fertilizers; crop rotations; manures; acid and alkali soils.

Prerequisites: Ch 101, 102, 103. Required in Agriculture; sophomore year; first and second terms; 3 credits each term; 2 lectures; 1 recitation; 1 three-hour laboratory period. Fee \$3.00 each term. Deposit \$2.00 each term.

C. V. Ruzek, E. F. Torgerson, W. W. Johnston

Sls 203. **Soil Drainage and Irrigation.** Principles of drainage and of irrigation; use of chain and level as applied to location and

installation of tile drains or irrigation laterals; design of tile systems; their effect upon soils and crops; costs and benefits.

Required in Agriculture; sophomore year; third term; 3 credits; 2 lectures; 2 recitations; 1 three-hour laboratory period. Fee \$2.00. Deposit \$1.00. *W. L. Powers, R. E. Stephenson*

SlS 311. Irrigation Farming. Methods of obtaining, distributing, and conserving irrigation waters; handling of different crops under irrigation; costs and profits; duty of water in various districts of Oregon; water rights and irrigation codes; field and laboratory studies of irrigation qualities of different soils; laying out of irrigation systems.

Required in Soils; junior year; first term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$1.00. Deposit \$1.00.

W. L. Powers, W. W. Johnston

SlS 312. Irrigation Farming Elective. Special course for Irrigation Engineering students or other students who cannot take the laboratory course in Irrigation Farming.

Elective; junior or senior year; first term; 2 credits; 2 recitations.

W. L. Powers

SlS 314. Western Land and Water Laws. A brief history of the development of water laws. Homestead laws, water rights, and irrigation codes in the different states, particularly in the Northwest and Oregon; appropriation, adjudication, and administration of water; reclamation and other Government and state land acts affecting reclamation development; organization and administration of irrigation districts and projects; water users' associations, etc.; discussion of public questions relating to reclamation.

Required in Soils; junior year; second term; 3 credits; 3 recitations.

W. W. Johnston

SlS 317. Dry Farming. Advanced study of the subject of moisture conservation, special tillage methods and machinery, soil and climatic conditions, etc., in dry-farming regions, with particular reference to Oregon and northwestern states. Offered in alternate years.

Prerequisite: SlS 201 or 202. Elective; junior or senior year; second term; 2 credits; 2 recitations.

W. L. Powers

SlS 318. Land Drainage. Field study of road, soil, and sanitary drainage; actual surveying, laying out, drafting of plans, estimation of cost, and installation of drainage systems; preparation of a complete report of the organization of a drainage district. Offered in alternate years. Not offered 1925-26.

Prerequisite: SlS 201. Required in Soils; junior year; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods (week-end). Fee \$1.00. Deposit \$1.00.

W. L. Powers

Sls 331. **Climatology.** Practical meteorology; observing and recording local weather and forecasting; a study of the climate of Oregon and the effect of climate upon agriculture. Offered alternate years. Offered in 1925-26.

Required in Soils and Farm Crops; junior year; third term; 2 credits; 1 recitation; 1 two-hour laboratory period. Fee \$1.00. Deposit \$1.00.

E. F. Torgerson

Sls 411. **Irrigation Field Practice.** This course aims to give practical knowledge of irrigation farming conditions. Careful records are kept of water used on different soils and crops and of the yield obtained from definite areas. This work may be done during the summer months in connection with duties as ditch rider or other field agent. A report is required and work is to be outlined with the instructor in advance.

Prerequisite: Sls 311. Elective; junior or senior year; any term; 2 to 4 credits.

Sls 414. **Advanced Irrigation.** Irrigation literature and methods of irrigation investigation; field and laboratory studies of irrigation experiments; calculation of depth of water applied and of the most economical production thereby secured; costs and profits connected with irrigation; analysis of data and preparation of a thesis. Field examinations are made, where possible, of some of the largest projects in the state.

Required in Soils; senior year; first term; 3 credits.

W. L. Powers, W. W. Johnston

Sls 417. **Irrigation Management.** A study of the operation and maintenance of irrigation systems; methods and records for water masters; control of agencies destructive to ditches; cost and durability of materials used in distribution of water on the farm; water rotations for different types of farming.

Elective; senior or graduate year; second term; 2 credits.

W. L. Powers

Sls 421. **Soil Physics.** Origin, formation, physical composition, and classification of soils; soil moisture, surface, tension, osmosis, capillarity, diffusion, aeration, temperature, and the resulting alteration in crop-producing power; influence of washing, drainage, and irrigation upon soils; laboratory determination and comparison of physical properties of various soil types; physical effect of mulches, rotations, and cropping; soil sampling and judging; mechanical analysis of soils.

Prerequisites: Sls 202, 203. Required in Soils; senior year; first term; 5 credits; 3 recitations; 2 three-hour laboratory periods. Fee \$2.00. Deposit \$1.00.

Sls 422. **Soil Physics.** Similar to Sls 421, but without laboratory work, for Agriculture students unable to take the regular course in Soil Physics and for students in Irrigation Engineering.

Elective; senior year; first term; 3 credits; 3 recitations.

R. E. Stephenson

Sls 424. **Soil Fertility.** Advanced work in composition and values of fertilizers and barnyard and green manures; maintenance and improvement of fertility; effect of the various crops and different systems of farming upon the fertility of the soil; crop rotations and fertility in different sections of the state and the United States; field-plot and pot-culture investigations.

Prerequisite: Sls 421. Required in Soils; senior year; second term; 5 credits; 3 recitations; 2 three-hour laboratory periods. Fee \$2.00. Deposit \$3.00.

C. V. Ruzek

Sls 425. **Soil Fertility Lectures.** Same as Sls 424, except no laboratory work.

Required in Farm Crops; senior year; second term; 3 credits; 3 recitations.

C. V. Ruzek

Sls 427. **Soil Survey.** For the advanced student who desires preparation for service at state experiment stations or in the Government Bureau of Soils. Study of the classification of soils and soil areas of the United States, of Oregon, and of the Northwest; much work in making regular and completed soil surveys of assigned areas, including field trips of inspection, with a report thereon.

Prerequisite: Sls 421 or 424. Required in Soils; senior year; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$1.00.

E. F. Torgerson

Sls 428. **Soil Management.** Occurrence, composition, characteristics, productivity, plant-food requirements, comparative values, and management of different soil types of Oregon.

Prerequisite: Sls 424. Required in Soils; senior year; third term; 3 credits; 2 recitations; 2 three-hour laboratory periods. Fee \$3.00.

W. L. Powers

Sls 441, 442, 443. **Advanced Soil Work.** The advanced student may study the various soil types of Oregon through mechanical analysis, and other physical tests; may undertake field work in soil surveying and mapping; or, through wire-basket pot-culture, and field-plot tests, may determine the effects of various systems of cropping, or fertilizing, or of soil bacteria, upon soil fertility.

Prerequisites: Sls 421, 424. Required in Soils; senior year; three terms; 3 credits each term. Fee \$1.00 each term. Deposit \$2.00 each term.

W. L. Powers, C. V. Ruzek

Sls 451, 452, 453. **Advanced Drainage or Irrigation Work.** Special problems in either subject, such as the drainage of alkali lands, drainage against seepage, study of water-table fluctuations, run-off etc.; or field studies of the duty of water for a certain district, conservation of irrigation waters, effect of irrigation on soil moisture conditions, etc., as selected by the student.

Prerequisite: Sls 311 or 318. Elective; senior year; three terms; 2 to 5 credits each term. Fee \$0.50 each term. Deposit \$1.00 each term. *W. L. Powers*

Sls 481, 482, 483. **Seminar.** Semi-weekly meetings, alternating with those of the Soils Improvement Club, at which papers on soils subjects are read and discussed. Papers are prepared under supervision of the department.

Required in Soils; senior year; three terms; 1 credit each term. *W. L. Powers, C. V. Ruzek, R. E. Stephenson*

Sls 601, 602, 603. **Thesis and Graduate Study.** Courses for graduate students either as major or minor. Students may select problems in soil physics, analysis, surveying, fertility, irrigation, drainage, soil management, dry farming, or related subjects. The work of the three terms is limited to a total of 12 credits.

Elective to graduate students; three terms; credits to be arranged. *W. L. Powers, C. V. Ruzek, R. E. Stephenson*

Sls 611, 612, 613. **Graduate Seminar.** A thorough, critical study of advanced research in soils and reclamation, and their relation to plant nutrition. Topics under discussion the three terms are: (1) Alkali land reclamation investigations, including drainage and irrigation. (2) Nutrient solution experimentation. (3) Soil solution investigations.

Prerequisite: Graduate standing in Soils or related courses. Elective; graduate year; three terms; 1 credit each term; 1 two-hour recitation period. *W. L. Powers, R. E. Stephenson*

VETERINARY MEDICINE

The object of the courses in Veterinary Medicine is to help fit the student for the successful handling of livestock. Comparative Anatomy and Comparative Physiology 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.

Equipment. This department has its office, physiological laboratory, and lecture room on the second floor of the Dairy Building. Dissections, autopsies, and clinics are conducted in a suitably equipped Veterinary Clinic Building.

COURSES

VM 301. Comparative Anatomy. A laboratory course in the anatomy of domesticated animals. Special attention is given to the digestive systems of the horse and the cow; to the foot, the teeth, and the muscles of locomotion of the horse. The work includes complete dissection of the digestive, urinary, genital, and respiratory systems, and partial dissection of the circulatory, muscular, and nervous systems.

Prerequisite: ZP 130 or equivalent. Required in Animal Husbandry and in Dairy Husbandry; junior year; first term; 3 credits; 1 lecture; 3 two-hour laboratory periods. Fee \$1.00.

B. T. Simms, F. W. Miller, C. R. Donham

VM 302. Comparative Anatomy. Continuation of VM 301.

Prerequisite: VM 301. Required in Animal Husbandry and in Dairy Husbandry; junior year; second term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$1.00.

B. T. Simms, F. W. Miller, C. R. Donham

VM 309. Anatomy of the Fowl. A study of the structure of the body of the fowl.

Required in Poultry Husbandry; junior year; second term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$1.00.

VM 321. Comparative Physiology. Study of the functions of the body; the physiological processes of all domestic animals, with emphasis on the horse and the cow.

Prerequisites: VM 302, Ch 224 or their equivalent. Required in Animal Husbandry and Dairy Husbandry; junior year; third term; 3 credits; 3 lectures; 1 two-hour laboratory period. Fee \$1.00.

B. T. Simms, C. R. Donham

VM 341. Diseases of Livestock. A one-term course for students specializing in the Plant Group. The more common diseases, with methods of prevention and control, are considered. The laboratory work consists of a free clinic.

Required in Agricultural Education; elective to others; junior or senior year; first term; 4 credits; 2 lectures; 2 recitations; 1 two-hour laboratory period. Fee \$0.50.

C. R. Donham

VM 351. **Diseases of Poultry.** The parasitic, infectious, and non-infectious diseases of poultry; emphasis upon methods of prevention and control of the parasitic and infectious diseases; observations of autopsies, methods of diagnosis, and treatment of fowls.

Required in Poultry Husbandry; junior year; third term; 3 credits; 3 recitations; 1 two-hour laboratory period. Fee \$0.50.

VM 441, 442, 443. **Diseases of Livestock.** The parasitic, infectious, and non-infectious diseases of domesticated animals. The laboratory work consists of a free clinic. Students assist in handling the medical cases, operating on the surgical cases, and caring for animals in the hospital.

Prerequisites: VM 302, 321, or equivalent. Required in Animal Husbandry; senior year; three terms; 3 credits each term; 2 recitations; 1 two-hour laboratory period. Fee \$0.50 each term.

B. T. Simms, F. W. Miller

VM 601, 602, 603. **Research.** Problems in animal diseases; for graduate students. Major or minor.

Elective; graduate year; three terms. Problems and credits to be arranged.

B. T. Simms, F. W. Miller

School of Basic Arts and Sciences

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
M. ELLWOOD SMITH, Ph.D., Dean of the School of Basic Arts and Sciences; Director of the Summer Session.
VERA FUNK, B.S., Secretary to the Dean.

Art and Rural Architecture

JOHN LEO FAIRBANKS, Professor of Art.
MARJORIE BALTZEL, Instructor in Art.
MARGARET BELL LAWSING, B.S., Instructor in Art.
ESSIE BEE PUMPHREY, B.Des., Instructor in Art.

Bacteriology

GODFREY VERNON COPSON, M.S., Professor of Bacteriology.
WILLIAM VERNAL HALVERSEN, Ph.D., Associate Professor of Bacteriology.
JOSEPH ELLSWORTH SIMMONS, M.S., Assistant Professor of Bacteriology.
JAMES ALEXANDER BERRY, M.S., Instructor in Bacteriology.

Botany and Plant Pathology

HOWARD PHILLIPS BARSS, A.B., S.M., Professor of Botany and Plant Pathology.
WINFRED MCKENZIE ATWOOD, Ph.D., Associate Professor of Plant Physiology.
WILLIAM EVANS LAWRENCE, B.S., Associate Professor of Plant Ecology.
CHARLES ELMER OWENS, A.M., Associate Professor of Plant Pathology.
HELEN MARGARET GILKEY, Ph.D., Assistant Professor of Botany; Curator of the Herbarium.
FRANK PERRY SIPE, M.S., Instructor in Botany.
MARGARET STASON, M.S., Instructor in Botany.

Chemistry

JOHN FULTON, M.S., Professor of Chemistry; Director of Chemical Laboratories.
SHIRLEY JONES, M.S., Professor of Agricultural Chemistry.
WALTER SCOTT, Ph.D., Associate Professor of Chemistry.
FRANCIS HENRY THURBER, Ph.D., Associate Professor of Organic Chemistry.

EARL GILBERT, Ph.D., Associate Professor of Physical Chemistry.
JOSEPH PARK MEHLIG, M.S., Assistant Professor of Chemistry.
OSMAN HORACE CADY, M.S., Assistant Professor of Chemistry.
ABRAHAM SCHWARTZ, M.S., Assistant Professor of Chemistry.
REX LOTHROP, B.E., Instructor in Chemistry.
HENRY PRICE HOWELLS, M.S., Instructor in Chemistry.
EDISON HERBERT SMITH, M.S., Instructor in Chemistry.
THOMAS FRANCIS SHEA, B.S., Instructor in Chemistry.
FERNLEY ASBURY TATUM, M.A., Instructor in Chemistry.
EARL WALTER PHELAN, M.A., Instructor in Chemistry.
HAZEL CLARA MURRAY, A.B., Instructor in Chemistry.
CLIFFORD WOODARD DUNCAN, B.S., Instructor in Chemistry.
JAMES STUART BLAIR, Ph.D., Instructor in Chemistry.
ROBERT AMBROSE OSBORN, Ph.D., Instructor in Chemistry.
GEORGE FREEMAN PETTENGILL, B.S., Assistant in Chemistry.

English Language and Literature

FREDERICK BERCHTOLD, A.M., Professor of English Language and Literature.
IDA BURNETT CALLAHAN, B.S., Associate Professor of English Language and Literature.
SIGURD HARLAN PETERSON, A.B., Associate Professor of English.
LORIN BURTON BALDWIN, A.M., Assistant Professor of English.
GERTRUDE EWING McELFRESH, A.M., Assistant Professor of English.
JOHN KIERZEK, A.M., Assistant Professor of English.
HARRY HOWARD TUCKER, A.B., Instructor in English.
FREDERICK DEAN MOORE, B.A., Instructor in English.
JAMES COLEMAN SCOTT, A.B., Instructor in English.
ELEANOR CALDWELL INGALLS, B.L., B.A., Instructor in English.
CLAUDE ELMER HENDERLITE, A.B., Instructor in English.
ELIAS THORLEIF ARNESEN, Ph.D., Instructor in English.
PHILLIPS DEAN CARLETON, A.B., Instructor in English.

Entomology

DON CARLOS MOTE, M.S., Professor of Entomology.
WILLARD JOSEPH CHAMBERLIN, M.S., Assistant Professor of Entomology.
HERMAN AUSTIN SCULLEN, A.B., Assistant Professor of Entomology.
THERESE BECKWITH, A.B., Entomological Technician.

History

JOHN B. HORNER, A.M., Litt.D., Professor of History; Director of Oregon Historical Research.
ERNEST VAN CORT VAUGHN, Ph.D., Associate Professor of History.
JOSEPH ELLISON, Ph.D., Instructor in History.

Mathematics

- CHARLES LESLIE JOHNSON, B.S., Professor of Mathematics.
 EDWARD BENJAMIN BEATY, B.S., A.M., Associate Professor of Mathematics.
 FREDERICK CHARLES KENT, A.B., Associate Professor of Mathematics.
 NICHOLAS TARTAR, B.S., Assistant Professor of Mathematics.
 HARRY LINDEN BEARD, B.S., Assistant Professor of Mathematics.
 JOHN ALBERT VAN GROOS, M.S., Assistant Professor of Mathematics.
 GEORGE ALFRED WILLIAMS, A.B., Instructor in Mathematics.
 FLOYD EUGENE YOUNG, A.B., Instructor in Mathematics.
 BELVA DIXON, B.S., Instructor in Mathematics.

Modern Languages

- LOUIS BACH, A.M., Professor of Modern Languages.
 MELISSA MARGARET MARTIN, B.S., A.M., Assistant Professor of Modern Languages.
 MINNIE JULIA WANGEN, A.B., Instructor in Modern Languages.

Physics

- WILLIBALD WENIGER, Ph.D., Professor of Physics.
 WILLIAM BALLANTYNE ANDERSON, Ph.D., Professor of Physics.
 JACOB JORDAN, A.M., Assistant Professor of Physics.
 ALBERT WASHINGTON MARKER, A.M., Instructor in Physics.
 FRED BUCHNER MORGAN, A.B., B.S., Instructor in Physics.
 HARRY DRILL, A.B., Instructor in Physics.
 JOHN CLIFTON GARMAN, B.S., Instructor in Physics.
 EDWIN ARTHUR YUNKER, A.B., Instructor in Physics.

Public Speaking and Dramatics

- CHARLES BUREN MITCHELL, A.M., Professor of Public Speaking.
 ELIZABETH MARIA BARNES, Assistant Professor of Dramatics.
 EARL WILLIAM WELLS, B.A., Instructor in Public Speaking.
 PERCY LORAIN EDWARDS, B.A., Instructor in Public Speaking.
 HAROLD ALBERT SEERING, B.A., Instructor in Public Speaking.

Zoology and Physiology

- NATHAN FASTEN, Ph.D., Professor of Zoology and Physiology.
 HOWARD MARSHALL WIGHT, M.S., Assistant Professor of Zoology and Physiology.
 FLORENCE HAGUE, Ph.D., Instructor in Zoology and Physiology.
 WILBUR DOANE COURTNEY, B.S., Instructor in Zoology and Physiology.
 JOHN LYNN OSBORN, Ph.C., A.M., Instructor in Zoology and Physiology.
 LAURA GARNJOBST, B.S., Technician in Zoology and Physiology.

The School of Basic Arts and Sciences, comprising the twelve departments of Art and Rural Architecture, Bacteriology, Botany and Plant Pathology, Chemistry, English Language and Literature, Entomology, History, Mathematics, Modern Languages, Physics, Public Speaking and Dramatics, and Zoology and Physiology, is an administrative organization furnishing instruction in arts and sciences fundamental alike in preparation for the various occupations and industries distinctively the concern of the Oregon Agricultural College and in education for citizenship. The scope and facilities of the several departments are discussed under the respective departmental headings.

ART AND RURAL ARCHITECTURE

The courses offered by the department of Art and Rural Architecture are closely connected with the work of other departments in the various schools of the College. The ideals to be developed are the practical application of form, color, design, and composition to the problems of every-day life in meeting the aesthetic requirement of personal adornment, home decoration, city beautification, commercial activities, and creative industrial development.

Art. Courses in drawing, design, color harmony, and the crafts aim to develop appreciation as well as creative skill in the application of art principles to objects of utilitarian service. Abundant opportunities are offered for cultivating a discriminating choice and imparting information through illustrated lectures and criticisms; at the same time skill is developed in the laboratory periods.

Rural Architecture. The courses in Architecture are offered to meet the requirements of rural communities in planning farm structures, service-yards, and homes, in interior decoration, in remodeling houses, in planning community recreation centers and semi-public buildings, and in town planning. The courses are offered primarily to students of Agriculture, Home Economics, Engineering, and Industrial Arts, but are elective to any students interested in domestic or rural architecture.

Equipment. The commodious and well-lighted studios on the third floor of Agriculture Hall and the metal working laboratory and clay-modeling room in the Mines Building offer ample accommodations and facilities, while the College Library has a carefully selected and growing reserve in Art and Architecture in all the branches covered by the courses offered.

COURSES

ART*

A 110. **Drawing and Composition.** Free-hand drawing with pencil, charcoal, and brush of still life, leaves, flowers, insects, birds, etc., for later decorative treatment; principles of perspective, simple mechanical drawings, free-hand lettering, reading working drawings, picture study and art appreciation. A note-book is required.

Required in Home Economics; freshman year; first term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50.

Marjorie Baltzel, Margaret B. Lawsing, Essie B. Pumphrey

A 120. **Design.** The principles of design and their application to things of service in personal adornment, home decoration, and crafts problems. Development of historic ornament is studied. A note-book is required.

Prerequisite: A 110 or equivalent. Required in Home Economics; freshman year; second term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50.

Marjorie Baltzel, Margaret B. Lawsing, Essie B. Pumphrey

A 130. **Color Harmony.** Color is studied for application to design and craft work with special attention to color harmonies and combinations in relation to household use, dress, furnishings and manufactured articles. The use and enjoyment of color is the basis of this course. The study of scales, values, and color theories. Note-book required.

Prerequisites: A 110, 120, or their equivalent. Required in Home Economics; freshman year; third term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50.

Marjorie Baltzel, Margaret B. Lawsing, Essie B. Pumphrey

A 152. **Composition.** Analytical study of the elements of design and pattern in landscape gardening photography.

Elective; second or third term; 3 credits; 1 lecture; 1 recitation; 2 two-hour studio periods.

A 213. **Drawing.** Study and graphic representation of cylindrical and rectangular objects in perspective; pencil shading; sketching; wash drawing; action and pose drawing; constructive drawing of trees, plants, leaves, flowers, and materials used in Landscape Gardening.

*In courses A 232, 241, 242, 251, 331, 332, the time is divided into 1 lecture and 5 hours laboratory work; course A 351 requires 1 lecture, 1 recitation, 2 two-hour studio periods.

Required in Landscape Gardening; elective to others; sophomore year; any term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50. *J. L. Fairbanks*

A 214. Cast and Still Life Drawing. A continuation of A 213. Preparatory for drawing and color technique with problems in wash drawing.

Prerequisite: A 213 or 110. Elective; sophomore year; second term; 2 credits; 3 two-hour studio periods.

A 215. Figure Drawing. Continuation of A 213 and 214. Preparatory course for color rendering. Drawing from birds, animals, life, and pose, with emphasis on constructive drawing, representation of values, etc.

Prerequisites: A 213, 214, or their equivalent. Elective; sophomore year; third term; 2 credits; 3 two-hour studio periods.

A 231. Industrial Arts Drawing. Free-hand perspective and sketching, constructive drawing of furniture and other articles, machine parts, shading and drawing from written descriptions, black-board sketching and introduction to color representation.

Required in Industrial Arts; sophomore year; first term; 2 credits; 1 lecture; 5 hours studio work. Fee \$0.50.

J. L. Fairbanks

A 232. Industrial Arts Design. A course in the principles of design suited to the Industrial Arts Curriculum. Original designs for cabinet work, metal work, color problems and industrial art products.

Prerequisite: A 231. Required in Industrial Arts; sophomore year; second term; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 233. Design. Theory and practice of design. Cement casting, pottery and metal work. Preparatory to art crafts.

Prerequisite: A 213 or equivalent. Intended for Industrial Arts students; elective to others; sophomore year; third term; 2 credits; 1 lecture; 5 hours studio practice. *J. L. Fairbanks*

A 241. Applied Design and Color. An elective offered to give broader working knowledge of design principles which may serve as a guide to selection and adaptation for practical application in the home. Problems in design and use of enamels, reliefs and gesso.

Prerequisites: A 110, 120, 130. Elective; sophomore year; second term; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 242. Applied Design and Color. A continuation of A 241 with problems in parchment, dies, etc.

Prerequisite: A 241. Elective; sophomore year; second or third term; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 243. **Applied Design and Color.** Continuation of A 242. Preparatory to craft work and intended primarily for Home Economics students. Problems in weaving, textiles, metal, etc.

Prerequisites: A 241, 242. Elective; third term; 2 credits; 2 two-hour studio periods.

J. L. Fairbanks

A 251. **Pencil and Pen Rendering.** Pencil and pen technique; use of the pencil and pen in the expression of landscape gardening subjects; sketching; pencil drawing as used under washes; studio and out-of-doors work.

Prerequisite: A 213. Required in Landscape Gardening; sophomore year; third term; 2 credits; 3 two-hour periods. Fee \$0.50.

J. L. Fairbanks

A 252, 253. **Pen and Ink Technique.** Drawing, cartooning, designing with pen and brush for titles, cover designs, illustrations for school publications, reproductions, etc. These courses give training in such work as is needed by students engaged in directing the art work of student publications, including the junior annual. The work is in relation to the commercial application of art.

Prerequisite: A 251 or equivalent. Elective; second and third terms; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 311, 312, 313. **Landscape Drawing.** Study of the presentation of drawings used by landscape architects and gardeners.

Required in Landscape Gardening; junior year; three terms; 3 credits each term; 9 periods. Fee \$1.00 each term.

J. L. Fairbanks

A 331. **Water-color.** The courses in water-color are offered as electives and are open to any students who have completed courses A 110, 120, and 130, or their equivalent. The work of the first term includes flat color washes of still-life subjects.

Elective; sophomore, junior, or senior year; any term; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 332. **Water-color.** A continuation of A 331, taking up more complex still-life subjects, posters, flowers, and landscape.

Prerequisite: A 331. Elective; sophomore, junior, or senior year; any term; 2 credits; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 333. **Design and Color Use.** The purpose of the course is to combine the use of design and color in more advanced problems

of every-day application. Original solutions of problems are required and a note-book covering lectures and assigned reading. Two hours outside reading required.

Prerequisites: A 110, 120, 130, or equivalent. Required in Home Economics; junior year; second term; 3 credits; 1 recitation; 3 two-hour studio periods. Fee \$0.50. *Margaret B. Lawising*

A 334. **Gesso and Leather Tooling.** The purpose of this course is to teach the application of gesso to objects of every-day use and in leather tooling to teach the various methods of tooling portfolios, bags, book covers, etc. For Home Economics and Industrial Arts students.

Prerequisite: A 333, or A 241, or A 233, or equivalent. Elective; sophomore or junior year; second term; 3 credits; 1 lecture; 3 two-hour studio periods. *Essie B. Pumphrey*

A 335. **Block Printing and Stenciling.** The course includes the various methods of block printing and stenciling and the mediums and materials employed. For students in Home Economics and Industrial Arts.

Prerequisite: A 333. Elective; sophomore or junior year; third term; 3 credits; 1 lecture; 3 two-hour studio periods.

Essie B. Pumphrey

A 336. **China Painting.** The purpose of this course is to teach the application of designs and colors to china. The methods of applying colors, glazes, enamels, and the process of firing are taught. Intended primarily for Home Economics students.

Prerequisite: A 130. Elective; sophomore, junior, or senior year; any term; 3 credits; 1 lecture; 3 two-hour studio periods.

Margaret B. Lawising

A 341. **Clay Modeling and Pottery.** Preparation of clay; designing and modeling of vases and bowls; application of original designs in incising and piercing; glazing and firing.

Prerequisites: A 110, 120, 130, or equivalent. Elective; sophomore, junior, or senior year; 2 credits; 3 two-hour studio periods. Fee \$2.00.

Marjorie Baltzel

A 342. **Clay Modeling and Pottery.** Introduction of handles, feet, and modeled decoration.

Prerequisites: A 110, 120, 130 (or equivalent), 341. Elective; sophomore, junior, or senior year; 2 credits; 3 two-hour studio periods. Fee \$2.00.

Marjorie Baltzel

A 343. **Clay Modeling and Pottery.** Application of principles previously studied to advanced problems; introduction of Japanese methods.

Prerequisites: A 110, 120, 130 (or equivalent), 341, 342. Elective; sophomore, junior, or senior year; 2 credits; 3 two-hour studio periods. Fee \$2.00. *Marjorie Baltzel*

A 345, 346, 347. **Cement Casting.** Modeling in clay; plaster and cement casting of garden furniture; and colored cement insert decorations for homes, etc. Intended primarily for students majoring in Industrial Arts and Landscape Gardening.

Prerequisites: A 213, 232 or equivalent. Elective; sophomore year; three terms; 3 credits each term; 3 two-hour studio periods. Fee \$1.00 each term.

A 351. **Color Rendering.** Color theory; brush technique; flat washes over pencil; use of water-color washes in the expression of landscape gardening subjects.

Prerequisite: A 251. Required in Landscape Gardening; elective to others; junior year; second term; 3 credits. Fee \$0.50.

J. L. Fairbanks

A 352. **Color Rendering.** Continuation of A 351. Application of color theory; rendering color washes of more complex landscape gardening subjects. Later in the term opportunity is given for out-of-doors sketching.

Prerequisite: A 351. Required in Landscape Gardening; junior year; third term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50.

J. L. Fairbanks

A 361. **Commercial Art I.** Commercial lettering with pen and brush for display cards, price-tags, etc., drawing of simple forms for posters, cut-out forms, etc. Note-book required.

Required in Commerce; elective to others; junior year; first term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$1.00.

J. L. Fairbanks

A 362. **Commercial Art II.** Window trimming, bill-board display, advertising illustrations, drawing of objects in perspective, figures, heads, and drapery; poster letters. Note-book required.

Prerequisite: A 510. Required in Commerce; elective to others; junior year; second term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$1.00.

J. L. Fairbanks

A 363. **Display Advertising.** Posters, drawing from figures, pose, features, etc.; original letter forms and figures. Note-book required.

Prerequisites: A 510, 520. Elective; sophomore, junior, or senior year; third term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$1.00.

J. L. Fairbanks

A 391. **Community Drama—Stage Design.** Planning and executing the setting for community drama; painting scenery; designing costumes; period settings, etc. Training for community service supplementary to that offered in Community Drama. To be taken with PSp 465, 466, or 467.

Elective; second term; 3 credits; 1 lecture; 1 recitation; 3 two-hour studio periods. Fee \$0.50.

A 411. **Art Appreciation.** The development of art in the practice of architecture, painting, and monumental art.

Prerequisite: one year college art. Elective; junior or senior year; second or third term; 3 credits; 3 recitations. Fee \$0.50.

A 441. **Jewelry Making.** Elementary processes involving sawing, soldering, and stone setting. Materials used are copper and silver.

Prerequisite: A 120 or equivalent. Elective; sophomore year; any term; 2 credits; 6 periods. Fee \$1.50. *Marjorie Baltzel*

A 442. **Jewelry Making.** A continuation of A 441, introducing advanced problems in wire work and carving.

Prerequisites: A 120, 441, or equivalents. Elective; sophomore year; any term; 2 credits; 6 periods. Fee \$1.50. *Marjorie Baltzel*

A 443. **Jewelry Making.** A continuation of A 442. Problems to be carried out in gold.

Prerequisites: A 120, 442, or equivalents. Elective; sophomore year; any term; 2 credits; 6 periods. Fee \$1.50. *Marjorie Baltzel*

RURAL ARCHITECTURE

Ar 212. **Perspective Drawing.** Study of the representation of building and grounds by means of mechanical perspective.

Elective; freshman year; second term; 1 credit; 3 periods. Fee \$0.50.

Ar 213. **Dairy Buildings.** Study of dairy barns, silos, etc., by drawing plans.

Elective; sophomore year; third term; 2 credits; 1 lecture; 5 studio periods. Fee \$0.50. *J. L. Fairbanks*

Ar 317, 318, 319. **Horticultural Products Building.** Study of evaporators, store houses, and other structures by drawing plans and inspecting buildings.

Elective; three terms; 1 credit each term; 3 periods. Fee \$0.50.

Ar 320. **Domestic Architecture.** Study of house arrangement (for women students).

Elective; junior year; any term; 2 credits; 1 lecture; 5 studio periods. Fee \$0.75.

J. L. Fairbanks

Ar 331, 332, 333. **House Planning.** Study of architecture by working drawings of houses, elevations, models, perspective.

Elective; junior year; three terms; 3 credits each term; 1 lecture; 1 recitation; 6 laboratory periods. Fee \$1.00 first term; \$0.50 second and third terms.

J. L. Fairbanks

BACTERIOLOGY

Bacteriology has become fundamental to such sciences as Agriculture, Pharmacy, and Home Economics and is a necessary part of the training of every man or woman who is seeking a true education. The courses in Bacteriology are adapted to meet both technical and cultural needs of the students. In the sophomore year the work is general and fundamental in nature, and practically the same for all students; but in the later courses it becomes more specialized, following some definite branch of the science. So complex has the study of Bacteriology become that the attempt is no longer made to master the whole field but only one or two of the main branches of the subject, such as Soil Bacteriology, Dairy Bacteriology, Pathogenic Bacteriology, and others.

During the junior and senior years, opportunity for advanced work is given to students who have had proper preliminary training and who show a natural aptitude towards the work. Students in Agriculture may elect Bacteriology as a minor, and receive the necessary fundamental training for positions in Agricultural Bacteriology in colleges, experiment stations, civil service, dairy and food inspection, etc.; while students in the Pharmacy and pre-Medical curricula may elect advanced work in Medical Bacteriology, Sanitation, and Public Health work. Graduate students in Dairy Husbandry, Soils, Horticultural Products, Pharmacy, or Home Economics, may elect Bacteriology as a minor with the approval of their major professor and the head of the department of Bacteriology.

Proper understanding of Bacteriology necessitates a fair knowledge of General Chemistry, which is therefore made prerequisite to the courses in Bacteriology. Before a student can progress very far in the work, a knowledge of Qualitative, Organic, and Agricultural Chemistry is necessary, but these subjects will have been taken by students in the degree curricula by the time they are required for their bacteriological work.

Equipment. The department of Bacteriology occupies the whole fourth floor of Agriculture Hall. The department is especially well equipped for resident study and Experiment Station work, with all facilities for instruction and research work and a departmental library containing the latest authentic text-books on bacteriology. The general library has all the available American and foreign bacteriological periodicals of recognized merit. The department is well supplied with the highest grade microscopes, glassware, and other equipment for general and advanced work.

COURSES

Bac 200. General Bacteriology. Elementary course in the fundamental principles of Bacteriology with application to everyday life. The bacteriology of food and water supplies; sanitation and hygiene; infectious disease; sewage disposal, etc. Designed to meet the needs of the students who have had no training in Chemistry but who desire a general knowledge of Bacteriology.

Elective; sophomore year; third term; 3 credits; 2 lectures; 1 recitation; 1 two-hour laboratory period. Fee \$3.00.

Bac 201. General Bacteriology (Agricultural). A series of lectures, recitations, and laboratory experiments to familiarize students with the fundamental principles of Bacteriology as applied to Agriculture.

Prerequisite: One year of Chemistry. Required in Agriculture; sophomore year; any term; 4 credits; 2 lectures; 3 two-hour laboratory periods. Fee \$5.00.

Bac 204. General Bacteriology. A series of lectures, recitations, and laboratory experiments to familiarize students with the fundamental principles of Bacteriology.

Prerequisite: One year of Chemistry. Required in Home Economics Professional Curriculum (sophomore year), and in Pharmacy (junior year); first or second term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 205. General Bacteriology. A continuation of Bac 204. A course adapted primarily to students in Home Economics. Bacteriology of food preservation, principles of sanitation, bacteriological studies of water, milk, and foods of all kinds; common infectious diseases; disinfection; germicides; and preservatives.

Prerequisite: Bac 201 or 204. Required in Home Economics Professional Curriculum; sophomore year; third term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 212. Zymology. This course is planned to train the student to meet the bacteriological problems in food preservation

such as the isolation, identification, and control of micro-organisms causing spoilage of fruits, vegetables, and other foodstuffs; the bacteriology of curing, ripening, and preserving food products.

Prerequisite: Bac 201 or 204. Required in Horticultural Products (sophomore year); elective in Agriculture; any year; second term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 213. **Zymology.** A continuation of Bac 212. Actual problems in the microbiological phases of food preservation with special attention to the practical laboratory tests as carried out in the canneries.

Required in Horticultural Products; sophomore year; third term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 301, 302, 303. **Advanced Bacteriology.** Beginning with the first term of the junior year, students in Agriculture and Pharmacy may elect Bacteriology as a minor and continue throughout the rest of their college course.

Prerequisite: Bac 201 or 204. Elective; junior year; three terms; 3 credits each term; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00 each term.

Bac 311. **Dairy Bacteriology.** Application of Bacteriology to dairy practices; physiological activities of bacteria underlying bacterial analysis of dairy products; dairy sanitation; bacteriology of diseases of dairy cattle.

Prerequisite: Bac 201 or 204. Elective in Dairy Husbandry; junior year; first term; 4 credits; 2 lectures; 3 two-hour laboratory periods. Fee \$5.00.

Bac 312. **Dairy Bacteriology.** A continuation of Bac 311. A more thorough study of specific problems in Dairy Bacteriology and practice in special technique, adapted to particular needs of individual students as far as possible, and planned to train students as bacteriologists for creameries and market milk plants.

Prerequisites: Bac 201, 311. Elective; junior or senior year; second term; 3 credits; 1 lecture; 3 two-hour laboratory periods. Fee \$5.00.

Bac 321. **Soil Bacteriology.** A study of micro-organisms of the soil and their relation to soil fertility; biochemistry of the decomposition of humus; nitrogen-fixation; ammonification, etc.; relation of bacteria to soil fertility and study of the soil as a medium for bacteriological growth.

Prerequisites: Bac 201, Ch 251. Elective in Agriculture; junior year; first term; 4 credits; 2 lectures; 3 two-hour laboratory periods. Fee \$5.00.

Bac 322. **Soil Bacteriology.** A continuation of Bac 321. A more thorough study in soil of different farm practices. Review of literature on Soil Bacteriology.

Prerequisite: Bac 321. Elective in Agriculture; senior year; second term; 3 credits; 1 lecture; 3 two-hour laboratory periods. Fee \$4.00.

Bac 332. **Pathogenic Bacteriology.** A course confined strictly to the study of the micro-organisms which cause disease in man.

Prerequisite: Bac 201 or 204. Required in Pharmacy; junior year; second term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 333. **Immunity and Serum Therapy.** A study of the theory of immunity and its application to serum therapy; preparation of toxins, antitoxins, vaccines, etc.; study of normal and pathological blood.

Prerequisite: Bac 205 or 332. Required in Pharmacy; junior year; third term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 401, 402, 403. **Advanced Bacteriology.** A continuation of Bac 303 comprising further training in the principles and technique of Bacteriology besides directing the study along one of the main lines of Bacteriology.

Prerequisite: Bac 303. Elective; senior year; three terms; 4 credits each term; 3 two-hour laboratory periods; 2 lectures. Fee \$5.00 each term.

Bac 413. **Agricultural Bacteriology (Advanced).** A final course in Bacteriology for students in Agriculture. Application of bacterial activities to farm practices and to the farm home; rural sanitation, hygiene, control of infectious diseases, fermentations, food preservation, etc.

Prerequisites: Bac 201, Ch 251. Elective; senior year; third term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$4.00.

Bac 481, 482, 483. **Seminar.** A discussion of the current literature on bacteriological topics.

Required in Agricultural Bacteriology; senior year; three terms; 1 credit each term; 1 period.

Bac 691, 692, 693. **Thesis and Graduate Study.** Work for the master's degree, as either a minor or a major in the department, may be selected and continued with the assistance and cooperation of the instructional staff of the department.

Prerequisite: Two years in Bacteriology. Credits and hours to be arranged. Fee \$2.00 a credit.

BOTANY AND PLANT PATHOLOGY

The courses offered in the department aim not only to give the student a knowledge of plants, their external and internal structure, their vital activities, their relations to their environment, and their natural classification; but also to impart such fundamental and practical information in regard to plants as will form a strong foundation for the technical work in Agriculture, Forestry, Pharmacy, and Home Economics.

Exceptional opportunities are afforded students who desire to specialize in Botany and Plant Pathology to prepare for the teaching of Botany and Agriculture in secondary schools and to secure a general foundation for advanced study and research in Horticulture, Agronomy, General Agriculture, Forestry, Grazing and other fields. Special attention is given to those who wish to take up investigational work in agricultural experiment stations or in the United States Department of Agriculture under the civil service. Training in Botany and Plant Pathology is a most valuable asset to agricultural extension workers, horticultural inspectors, district agriculturists, grazing experts, seed analysts, and pure-food experts.

Equipment. The department of Botany and Plant Pathology is quartered on the second floor of Agriculture Hall. The three general student laboratories are equipped with compound microscopes for each student and with special artificial illumination for microscopic work. The laboratories for special studies in Plant Pathology, Plant Physiology, Plant Ecology, and Plant Histology are provided with all the equipment required for ordinary courses and in addition special instruments and technical apparatus are available for advanced work. The herbarium contains several thousand specimens of native and introduced plants including cultivated forms, weeds, poisonous plants, drug plants, grazing plants, forest trees, and other plants of economic importance. A battery of electrical driers is provided for collected material. Several thousand specimens of fungi, mostly parasitic forms, are comprised in the mycological collection. Physiologic dark rooms, photographic dark rooms, greenhouse space, and culture and sterilizing rooms for work with parasitic organisms are available. The departmental library contains excellent sets of reference works and bulletins, and receives the current issues of practically all of the more important botanical periodicals published in America and foreign countries.

Courses for Students Pursuing a Minor in Botany and Plant Pathology. Students in the Schools of Home Economics, Com-

merce, Vocational Education, etc, who desire to specialize to some extent in the field of plant science or to prepare for botanical teaching may take a minor in this department by completing courses totaling not less than 18 credits. The following schedule including two years' work, one course each term, is suggested for such students:

MINOR IN BOTANY AND PLANT PATHOLOGY

Freshman year for general students in Home Economics

Junior year for students in Commerce and Vocational Education

	Term		
	1st	2d	3d
The Plant Kingdom (Bot 202) (or Bot 102, 4 credits).....	3	.....	.....
The Seed Plants (Bot 201) (or Bot 101, 4 credits) .....	.....	3	.....
Plant Identification (Bot 203).....	.....	.....	3
<i>Junior or senior year for general students in Home Economics</i>			
<i>Senior year for students in Commerce and Vocational Education</i>			
Plant Science in Secondary Schools (Bot 471).....	.....	.....	3
Plant Morphology (Bot 441).....	4	.....	.....
Plant Histology (Bot 443).....	.....	3	.....
Principles of Plant Pathology (Bot 311).....	4	.....	.....
Plant Physiology (Bot 321).....	.....	.....	4
Plant Ecology (Bot 442).....	.....	.....	3

Courses for Students Majoring in Botany and Plant Pathology.

Students desiring to pursue special training in Botany and Plant Pathology are expected to take the usual work required in the freshman and sophomore years of the curricula in Agriculture, Forestry, Pharmacy, or Home Economics with but slight modifications. In the junior and senior years, besides the courses or options required of all students in these schools, special courses in Botany and Plant Pathology and related subjects are prescribed by the department of Botany and Plant Pathology. See page 86. Students should consult the head of the department before entering on major work.

Graduate Courses. Advanced work in Plant Pathology, Physiology, Ecology, Morphology, Taxonomy, etc., or in technical methods employed in plant science research may be taken by graduate students as major or minor subjects and registered for under Bot 691, 692, 693. Graduate work leading to the master's degree with major in the field of Botany and Plant Pathology is offered. Such work is outlined by the head of the department with approval of the Committee on Graduate Study and carried forward under the immediate direction of an instructor specializing in the field in which the major is chosen.

Grazing Assistant Positions. The United States Forest Service offers abundant opportunity for properly prepared college students to enter grazing assistant positions in the national for-

ests. Students desiring to prepare for these positions should consult this department for complete information as to requirements. The following Botany courses should be taken: Bot 101, 102, 203, 321, 341, 442. In addition, work should be taken in Animal Husbandry, Chemistry, Forestry (F 111, 112, 212, 311), and English (Eng 201).

COURSES

Bot 101. **General Botany.** A study of higher plants as living things faced with problems of existence, of their fundamental structure, and their physiology.

Required in Agriculture and Forestry; elective to others; freshman year; any term; 4 credits; 1 lecture; 1 recitation; 3 two-hour laboratory periods. Fee \$2.50.

Bot 102. **General Botany.** A study of the vegetable kingdom as a whole; forms causing plant diseases or producing decay; main characteristics of the principal families of agricultural plants.

Required in Agriculture; elective to others; freshman year; any term; 4 credits; 1 lecture; 1 recitation; 3 two-hour laboratory periods. Fee \$2.50.

Bot 107, 108, 109. **Pharmaceutic Botany.** A three-term sequence preparatory to Pharmacognosy and Materia Medica and concentrated upon the study of various plant tissues, identification of drug plants, study of crude and powdered drugs and their identification.

Required in Pharmacy; freshman year; three terms; 3 credits each term; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00 each term.

F. P. Sipe

Bot 201. **The Seed Plants.** A study of the structure and vital activities of higher plants and their relation to their environment. (Similar to Bot 101 but abbreviated.)

Elective; sophomore year; any term; 3 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00.

Bot 202. **The Plant Kingdom.** A study of representative members of the different groups of plants from lowest to highest, comparing their structure and reproductive methods and their position in the scale of plant evolution. (Similar to Bot 102 but abbreviated.)

Required in General Forestry (freshman year); elective to others; any term; 3 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00.

Bot 203. **Plant Identification.** A study of the families of higher plants and the identification of wild flowers, trees, shrubs, weeds,

ornamentals, crop plants, etc., as students may elect; field trips for collecting, and laboratory analysis of material thus collected; practice in drying and mounting plant specimens.

Prerequisite: An elementary course on seed plants. Required in certain major curricula in Agriculture; elective to others; junior or senior year; third term; 3 or more credits; 1 recitation; 2 three-hour laboratory periods or field trips. (Additional periods for additional credit.) Fee \$0.50 each credit.

Helen M. Gilkey

Bot 311. Principles of Plant Pathology. Causes, symptoms, effects, and means of dissemination of disease in plants; principles of plant disease control; laboratory work with various types of plant diseases and the different groups of plant parasites.

Prerequisites: Bot 101 and 102, or 202 and 203. Required in certain major curricula in Agriculture; elective to others; junior year; first term; 4 credits; 2 recitations; 3 two-hour laboratory periods. Fee \$2.50.

C. E. Owens

Bot 312. Fruit Diseases. Causes, symptoms, progress, and control of the important fungous, bacterial, and physiological diseases of orchard trees and small fruits, with emphasis on those of importance in the Pacific Northwest. Studies in the laboratory are supplemented by field excursions.

Prerequisite: Bot 311. Required in Pomology; elective to others; junior year; third term; 3 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00.

C. E. Owens

Bot 313. Diseases of Field Crops and Vegetables. Similar to Bot 411, but dealing with diseases of field crops and truck and garden vegetables.

Prerequisite: Bot 311. Elective; second term; 3 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00.

C. E. Owens

Bot 314. Forest Pathology. The parasitic and saprophytic fungi which attack forest trees and destroy structural timber; their effects upon the wood; preventive measures.

Prerequisites: Bot 101, 202, or their equivalent. Elective; second term; 3 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$1.50.

C. E. Owens

Bot 321. Plant Physiology. A study of the life processes and vital requirements of the plant as a basis for intelligent agricultural and horticultural practice; physiology of the living plant; response made by the plant to the influences surrounding it; laboratory experiments.

Prerequisites: Bot 101 and 102, or 202 and 203, and Qualitative, Quantitative, and Organic Chemistry. Required in certain

major curricula in Agriculture; elective to others; junior or senior year; third term; 4 credits; 1 lecture; 1 recitation; 3 two-hour laboratory periods. Fee \$4.00. Deposit \$2.00. *W. M. Atwood*

Bot 341. Range and Pasture Botany. A study of the edible, non-edible, and poisonous plants of the range and pasture; relation of grazing to the maintenance of ranges and pastures; methods of preventing stock poisoning or of eradicating poisonous plants. Of interest to students in Animal Husbandry and Dairy Production, and to students in Forestry.

Prerequisites: Bot 101 and 102, or 202 and 203. Elective; second term; 3 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$1.50. *W. E. Lawrence*

Bot 414. Study of Fungi (Mycology). A study of the different groups of fungi with special attention to parasitic forms, dealing with structure, life-history and classification. An advanced course.

Prerequisites: Bot 101 and 102, or 202 and 203. Elective for advanced or graduate students; second term; 4 credits; 2 recitations; 3 two-hour laboratory periods. Fee \$2.50. *H. P. Barss*

Bot 415. Plant Pathological Technique. A training course in the technical methods employed in plant pathological investigations; isolation, cultivation, and inoculation of parasitic organisms; record keeping; care of collections; photographic methods, etc. For advanced students.

Prerequisite: Bot 311. Elective for advanced or graduate students; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$3.00. *H. P. Barss*

Bot 441. Comparative Morphology and Evolution of Plants. An advanced course aiming to show the tendencies and causes which impel or control evolution within the plant kingdom and designed to broaden the student's knowledge of the different groups of plants by comparison of the organic structure, life-histories, cytological development, and reproductive processes of representative forms. Basic to work in Genetics, Plant Breeding, and advanced biologic study. Offered in alternate years. Offered in 1925-26.

Prerequisites: Bot 101 and 102, or 202 and 203. Elective for advanced or graduate students; first term; 4 credits (extra credit may be allowed for extra laboratory work); 1 lecture; 1 recitation; 3 two-hour laboratory periods. Fee \$3.00. *W. E. Lawrence*

Bot 442. Plant Ecology. A study of the effects on living plants of external influences such as climate, soil, physiography, etc., under natural conditions or under conditions modified by

agriculture; native vegetation as an indicator of agricultural possibilities. Of special value to students of Agriculture, Forestry, Grazing, Agricultural Economics, Irrigation and Drainage, Plant Introduction, Geology, and Botany, and any expecting to enter state or Federal field service.

Prerequisites: Bot 101 and 102, or 202 and 203. Elective for advanced or graduate students; third term; 3 credits; 1 lecture; 1 recitation; 1 three-hour laboratory period. Fee \$2.00.

W. E. Lawrence

Bot 443. **Plant Histology.** An advanced course dealing with the structure, inclusions, activities, and methods of division of the plant cell; development, structure, and relation to function of various types of plant tissues; training in the technique of making temporary and permanent microscopic mounts, including sectioning, staining, etc. Offered in alternate years. Not offered in 1925-26.

Prerequisites: Bot 101 and 102, or 202 and 203. Elective for advanced or graduate students; second term; 3 credits (extra credit may be allowed for extra laboratory work); 1 recitation; 2 three-hour laboratory periods. Fee \$3.50.

C. E. Owens

Bot 451, 452, 453. **Advanced Study and Thesis.** For students specializing in Botany and Plant Pathology. Investigation of special problems or advanced studies not included in regular courses.

Elective; junior or senior year; any term; credit, hours of work, etc., to be arranged with major professor.

Bot 471. **Application of Plant Science in Secondary School Teaching.** For prospective teachers of agriculture or natural science in secondary schools. Deals with point of view, methods, materials, texts and equipment in teaching plant science subjects and considers the manner in which the work should be adapted to the interests, needs, and possibilities of any particular community.

Prerequisite: Two terms of elementary Botany. Elective; third term; 3 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods or field trips. Fee \$2.00.

F. P. Sipe

Bot 481, 482, 483. **Seminar.** The seminar is attended and contributed to by advanced students and instructional staff in the department. Students are required to prepare and present papers on assigned topics.

Required in Botany and Plant Pathology; senior or graduate year; three terms; 1 credit each term; 1 period.

Bot 621. **Advanced Plant Physiology.** A course dealing with the present status of scientific knowledge in regard to the prob-

lems of the water relation, nutrition, and growth of plants. Fundamental to investigational work with plants.

Prerequisite: Bot 321 or equivalent. Elective; senior or graduate year; second term; 3 credits; 2 lectures; 1 recitation.

W. M. Atwood

Bot 691, 692, 693. **Thesis and Graduate Study.** Graduate students may register under these numbers for special studies and investigations of graduate grade in any line of work included within the scope of the department of Botany and Plant Pathology such as plant pathology, physiology, morphology, ecology, taxonomy, mycology, histology, range botany, poisonous plants, technique, etc. Thesis work for the master's degree is taken under these numbers.

Elective for graduate students; three terms; credits, hours, prerequisites, etc., are arranged by the instructor in charge of the major line of work pursued, subject to the approval of the head of the department.

CHEMISTRY

The foundation courses in Chemistry consist in familiarizing the student with the more important underlying principles of the science and the fundamentals of laboratory technique.

The following lines of specialization are suggested:

(1) **Agricultural Chemistry.** Study and analysis of soils, feeds, fertilizers, dairy and horticultural products; animal nutrition and general experiment station work.

(2) **Inorganic Chemistry and Analysis.** Study and analysis of minerals, ores, alloys, and the products of metallurgical and other inorganic chemical industries, including advanced inorganic chemistry and a study of the rarer elements and their technical application.

(3) **Pharmaceutical and Physiological Chemistry.** Study of the chemical processes more intimately associated with foods, drugs, pharmaceutical products, and the products of the human economy, including comprehensive analytical methods, and advanced organic synthesis.

(4) **Chemical Engineering.** Preparation for the field of industrial chemical technology.

COURSES

Ch 101, 102, 103. **General Chemistry.** (1) Fundamental principles and their application; the non-metallic elements and their compounds; laboratory work in the identification of anions. A

two-week introductory course in elementary physical concepts precedes the regular work. (2) Metallic elements and their compounds; introductory study of chemical equilibrium; theory of solution; law of mass-action and the periodic law. The laboratory work completes anion classification and identification, and includes study of the reactions of the cations and their identification. Ch 101, 102, 103 form a sequence.

Required in Agriculture, Home Economics, and Engineering; freshman year; three terms; 3 credits each term; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$4.50 each term. Deposit \$3.00 each term.

Ch 104, 105, 106. **General Chemistry.**

Prerequisite: High-school Chemistry and Physics. Required in Chemical Engineering, Mining Engineering, and Pharmacy; freshman year; three terms; 5 credits each term; 2 lectures; 2 recitations; 2 three-hour laboratory periods. Fee \$7.50 each term. Deposit \$3.00 each term.

7 Ch 221. **Organic Chemistry.** Study of occurrence, methods of preparation, characteristic reactions, and properties of the more common organic compounds.

Prerequisite: Ch 103. Required in Home Economics; sophomore year; first term; 5 credits; 2 lectures; 1 recitation; 3 two-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

7 Ch 222, 223. **Chemistry of Foods and Digestion.** Nature of the carbohydrates, proteins, fats in common food stuffs; qualitative tests for these; chemical changes foods undergo in the process of digestion and metabolism.

Prerequisite: Ch 221 or 226. Required in Home Economics; sophomore year; second and third terms; 2½ credits each term; 1 lecture; 1 recitation; 1 three-hour laboratory period. Fee \$3.75 each term. Deposit \$3.00 each term.

Ch 224. **Organic Chemistry.** A course similar to Ch 221, but dealing also with the carbohydrates, proteins, and other compounds of carbon which are of special importance along agricultural and biochemical lines.

Prerequisites: Ch 103, 247. Required in Agriculture; sophomore year; second term; 5 credits; 2 lectures; 1 recitation; 2 three-hour laboratory periods. Fee \$7.50. Deposit \$4.00.

Ch 226, 227. **Organic Chemistry.** A two-term sequence in the chemistry of the carbon compounds; the aliphatics, aromatics, and derivatives.

Prerequisite: Ch 106. Required in Pharmacy; sophomore year; first and second terms; 5 credits each term; 2 lectures; 1 recitation;

2 three-hour laboratory periods. Fee \$7.50 each term. Deposit \$4.00.

Ch 231. **Qualitative Analysis.** The classification, separation, identification of the common ions and cations; dissolving and analysis of solid subjects, including salts, alloys, etc.

Prerequisite: Ch 106 or equivalent. Sophomore year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 232. **Qualitative Analysis.** Similar to Ch 231 but more extended. Some work is given in the identification of the less common metals, and qualitative tests are made with boiler scale and cement.

Prerequisite: Ch 106 or equivalent. Required in Chemical Engineering and in Mining Engineering; sophomore year; first term; 5 credits; 2 lectures; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 233. **Qualitative Analysis.** Advanced Course. Review of the theory and practice of analytical operations and the application of the principles of the preceding courses in General Chemistry and Qualitative Analysis. The separation and identification of the less common elements such as selenium, tellurium, vanadium, and tungsten. Some practice is given in "dry analysis" so as to enable the student to grasp this method of attack in complete analysis.

Prerequisites: Ch 106, 231, or their equivalent. Elective; sophomore year; third term; 5 credits; 2 lectures; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 241. **Quantitative Analysis.** Elementary gravimetric and volumetric analysis as far as through oxidation and reduction.

Sophomore year; second term; 3 credits; 1 recitation; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 242. **Quantitative Analysis and Chemistry of Fuels.** Given in two sections: Ch 242a is a continuation of Ch 241, 2 credits; Ch 242b deals with Chemistry of Fuels, 1 credit.

Required in Mines; sophomore year; third term; 3 credits; 2 three-hour laboratory periods; recitation periods to be adjusted in Ch 242a; 1 lecture in Ch 242b. Fee \$3.00. Deposit \$3.00.

Ch 244. **Quantitative Analysis.** Elementary quantitative analysis.

Required in Pharmacy (third term), Chemical Engineering and Mining Engineering (second term); sophomore year; 5 credits; 1 lecture; 1 recitation; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 245. **Quantitative Analysis.** Continuation of Ch 244. Analysis of steels, brasses, and metallurgical and industrial products.

Required in Chemical Engineering; sophomore year; third term; 5 credits; 1 recitation; 1 lecture; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 247. **Quantitative Analysis.** Introducing the principles of gravimetric and volumetric analysis through the use of Agricultural material.

Prerequisite: Ch 103. Required in Agriculture; sophomore year; first term; 5 credits; 2 recitations; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 251. **Agricultural Chemistry.** The lectures emphasize the chemical principles involved in crop production and crop utilization. The laboratory work introduces the student to the chemical properties and behavior of soil and plant compounds.

Prerequisites: Ch 224, 247. Required in Agriculture; sophomore year; third term; 5 credits; 3 lectures; 2 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 321. **Textile Identification.** Identification of the different materials used in the textile industries.

Prerequisites: Ch 103, 221. Elective; junior year; third term; 2 credits; 1 lecture; 2 two-hour laboratory periods. Fee \$3.00. Deposit \$3.00.

Ch 322, 323. **Organic Chemistry.** A two-term sequence in organic chemistry planned for students specializing in science courses. A general survey of both the aliphatic and aromatic series, including preparation, properties, interpretation of reactions, and commercial value of the main groups of compounds.

Prerequisite: Ch 106. Required in Chemical Engineering; junior year; first and second terms; 5 credits each term; 2 lectures; 1 recitation; 2 three-hour laboratory periods. Fee \$7.50 each term. Deposit \$4.00 each term.

Ch 328. **Organic Analysis.** Qualitative tests and analysis of some organic compounds and mixtures; quantitative determination of carbon, hydrogen, nitrogen, and sulfur in organic compounds.

Prerequisites: Ch 227, 244. Required in Chemical Engineering; junior year; third term; 5 credits; 2 lectures; 3 three-hour laboratory periods. Fee \$7.50. Deposit \$3.00.

Ch 351, 352, 353. **Agricultural Analysis.** Gives acquaintance with methods and develops technique of quantitative analyses characteristic of experiment station and agricultural laboratories. The three terms are required of seniors in Agricultural Chemistry, but other students may take any term separately. (a) *Analysis of*

Nutrient Solutions, including soil and plant extracts (first term, recommended to juniors in Soils); (b) *Analysis of Creamery Products* (second term, recommended to juniors in Dairy Manufacturing); (c) *Analysis of Fruits and Fruit Products* (third term, recommended to juniors in Horticultural Products). Other work, however, (d) *Feeds*, (e) *Fertilizers*, (f) *Insecticides*, may be substituted if circumstances warrant, the object being to give the student the kind of analytical work that most nearly fits his requirements.

Prerequisite: Ch 251. Required in Agricultural Chemistry (senior year); elective to others; three terms (or any one term may be elected); 3 credits each term; 3 three-hour laboratory periods. Fee \$4.50 each term. Deposit \$3.00 each term.

Ch 354, 355, 356. **Plant Biochemistry.** Detailed study of the chemical properties of plant compounds and corresponding enzymes, based on Onslow's Practical Biochemistry, with collateral reading. Recommended to students majoring in Botany, Bacteriology, Horticulture, and Soils.

Prerequisite: Ch 251. Required in Agricultural Chemistry; junior year; 3 terms; 3 credits each term; 3 three-hour laboratory periods. Fee \$4.50 each term. Deposit \$3.00 each term.

Ch 371. **Alkaloidal Testing.** Study of the properties of the common alkaloidal drugs; testing for detecting and methods for isolating the common poisons from plants and animal tissues.

Prerequisites: Ch 224, 227. Required in Pharmacy; junior year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 374. **Drug Assaying.** Quantitative estimation of the active principles of crude drugs and their preparations, such as solid and fluid extracts, tinctures, pills, etc.

Prerequisite: Ch 371. Required in Pharmacy; junior year; second term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 375. **Advanced Drug Assaying.** An advanced course for students in Pharmacy who intend to enter manufacturing pharmaceutical laboratories.

Prerequisite: Ch 374. Elective; senior year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 377. **Food and Drug Analysis.** Designed to fit students for positions in food and drug laboratories. Qualitative and quantitative analysis of food and drug products commonly subject to adulteration.

Prerequisites: Ch 224 or 227; Bot.109. Required in Pharmacy; senior year; second term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 378. **Advanced Food and Drug Analysis.** Continuation of Ch 377.

Prerequisite: Ch 377. Elective in Pharmacy; senior year; second term; 3 credits; 3 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 381. **Physical Chemistry.** A study of the more important principles of physical and electro-chemistry. The laboratory work includes molecular weight determinations, properties of liquids, conductance of solutions, velocity of reactions, and electrochemical measurements.

Prerequisites: Ch 106, 233, 245; Mth 131. Required in Chemical Engineering (junior year) and in Agricultural Chemistry (senior year); first term; 3 credits; 2 lectures; 2 three-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 382, 383. **Physical Chemistry.** A continuation of Ch 381.

Prerequisite: Ch 381. Required in Chemical Engineering (junior year) and in Agricultural Chemistry (senior year); second and third terms; 3 credits each term; 2 lectures; 2 three-hour laboratory periods. Fee \$4.50 each term. Deposit \$3.00 each term.

Ch 411. **Elementary Glass Blowing and Repairing.** Elements of the art of welding, cutting, and grinding glass.

Elective; junior or senior year; any term; 1 credit; 1 three-hour laboratory period. Fee \$2.00.

Ch 421, 422. **Organic Chemistry.** A continuation of Ch 322, 323. Emphasis placed upon the methods of synthesis, interpretation of reactions, and structure of organic compounds.

Prerequisite: Ch 323. Elective; senior year; first and second terms; 2 credits each term; 2 lectures.

Ch 423. **Organic Preparations.** The more important methods of synthesis, such as Grignard's, Friedel-Craft's, Perkins' reaction, and others are studied. Preparations involving these reactions are carried out in the laboratory in order that the student may become thoroughly familiar with them and gain a good laboratory technique.

Prerequisite: Ch 227 or 323. Elective; senior year; third term; 4 credits; 1 lecture; 10 periods laboratory work. Fee \$7.50. Deposit \$5.00.

Ch 446. **Advanced Quantitative Analysis.**

Prerequisite: Ch 245 or equivalent. Elective in Chemical Engineering and Pharmacy; junior or senior year; any term; 3 credits; 3 periods laboratory work. Fee \$4.50. Deposit \$3.00.

Ch 461. **Physiological Chemistry.** General properties and the chemistry of the carbohydrates, fats, and proteins, with brief reference to the digestion of these food products.

Prerequisite: Organic Chemistry. Elective; second term; 3 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 462. **Physiological Chemistry.** Continuation of Ch 461. Enzyme action, salivary, gastric, and pancreatic digestion, action of the bile, general metabolism, putrefaction products; qualitative and quantitative analysis of milk, blood, and urine. Laboratory work may be arranged to fit special needs of students.

Prerequisite: Ch 461 or equivalent. Required in Agricultural Chemistry and Agricultural Bacteriology; junior year; third term; 3 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$4.50. Deposit \$3.00.

Ch 484, 485, 486. **Advanced Physical Chemistry.** A thorough study of physical chemical principles with emphasis on applications of calculus and thermodynamics. The kinetic theory, solutions, chemical equilibrium, electrochemistry, etc.

Prerequisite: Ch 383, 481, 482. Elective; senior year; 3 terms; 2 credits each term; 2 periods.

Ch 487, 488, 489. **Physical Chemistry (Seminar).** An advanced course adapted primarily to the needs of senior or graduate students in Chemical Engineering or Agricultural Chemistry. Topics such as applications of physical methods to organic chemistry, the phase rule, colloids, radioactivity and atomic structure, X-rays and crystal structure, electronic conception of valence, etc., may be chosen.

Prerequisite: the consent of the instructor. Elective; three terms; 2 credits each term; 2 periods.

Ch 490. **Minor Seminar in Chemistry.** Required of student assistants in Chemistry; open also to students who intend to teach elementary Chemistry in high schools. Topics covered: the fundamental principles of Chemistry and methods of presentation to classes; discussion of note-books and examination papers; methods of grading; classroom and laboratory administration; assembling apparatus; laboratory furnishings; repairs.

Prerequisites: Ch 106, 231, 244, 381. Elective; 3 lectures or laboratory periods. Fees and deposits to be arranged.

Ch 491, 492, 493. **Advanced Inorganic Chemistry.** An advanced course intended to classify and correlate the student's knowledge of the field of chemistry as viewed from the several standpoints of the various courses he has pursued. Lectures, col-

lateral readings, and discussions on the periodic system from the point of view of Mendeljeff, Lothar Meyer, Harkins, and Werner; valency; X-ray and crystal structure; molecular symmetry as exemplified in crystal form; chemistry of the rarer elements; higher order compounds; complex inorganic acids; inorganic stereochemistry and isomerism; electron theory and electromerism; correlation of inorganic and organic Chemistry based on the electron theory; the later ideas of valency; cooling curves and thermal analysis; colloids; and similar topics.

Elective; three terms; 2 meetings.

Ch 494. **History of Chemistry.** Rise and development of chemical theories and laws.

Prerequisite: Ch 106 or equivalent. Elective; second term; 2 credits; 2 lectures or recitations.

Ch 495. **Research.** Properly qualified students who have maintained a satisfactory grade may elect not more than 5 credits of research in the major subject during the senior year. Credit to be granted will be determined by the major instructor.

Elective: senior year; any term; credit and fees to be arranged.

Ch 600. **Research.** Properly qualified students are allowed to conduct investigational work along any of the ordinary lines of chemical research. This requires both library and laboratory work under the supervision of an instructor.

Ch 600a. Research in Inorganic Chemistry.

Ch 600b. Research in Analytical Chemistry.

Ch 600c. Research in Physical Chemistry.

Ch 600d. Research in Organic Chemistry.

Ch 600e. Research in Agricultural Chemistry.

Elective; graduate year; any term; fees and deposits according to course, number of laboratory periods, and credits.

Ch 621, (622, 623) **Advanced Organic Chemistry.** Lectures and assigned readings on special topics in organic chemistry; class reactions; the mechanism of important reactions; organic nitrogen derivatives; proteins; carbohydrates; geometric isomerism; optical isomerism; trivalent carbon; benzene; naphthalene; pyridines; and electronic structure of some organic compounds.

Prerequisite: Ch 323. Elective; 3 terms; 2 lectures; 2 credits each term.

ENGLISH LANGUAGE AND LITERATURE

It is the aim of this department to teach the student that the essential part of any effective composition, whether oral or written, is thought well organized and well expressed; that to comprehend clearly and to feel strongly what he has to say, are the indispensable conditions of making others comprehend and feel. Thought so organized and expressed is found in good literature; this he is taught to appreciate. In all the courses in English the work is correlated with that offered in the other departments, to bring it into harmony with the spirit of the institution.

Equipment. The College Library, with its excellent resources in general and technical literature, including all the leading periodicals, affords abundant opportunity for the student in English. In addition, the opportunities for expression and appreciation afforded by the student activities and organizations—forensic, dramatic, literary, and journalistic—are exceptionally attractive. (For courses in Public Speaking and Dramatics see page 183.)

COURSES

Eng 101. English Composition. Review of principles of rhetoric; practice in written and oral composition; frequent conferences between instructor and student as aids in meeting individual needs.

Note: All students registering in Eng 101 are required to have passed the general examination given the first of the term; see page 37.

Prerequisites: Three units of English earned in standard high schools. Required in all curricula; freshman year; first term; 3 credits; 3 recitations. Fee \$0.25.

Eng 102. English Composition. Continuation of Eng 101. Reading, practice writing, and discussion to cultivate clearness of thought and accuracy of expression. The work is modified and adapted to meet the requirements of the students in the several schools.

Prerequisite: Eng 101. Required in all curricula except Commerce (see Eng 105); freshman year; second term; 3 credits; 3 recitations. Fee \$0.25.

Eng 103. Technical Composition. Classes organized according to schools or curricula. Material for practice writing is worked out in active cooperation with instructors in technical courses.

Prerequisite: Eng 102. Required in all curricula except in Commerce (see Eng 106); freshman year; third term; 3 credits; 3 recitations.

Eng 105. **Business Correspondence.** The business letter in detail, special attention being given to letters of application, letters of inquiry and information, circular letters, letters of complaint, sales letters, follow-up letters, and collection letters.

Prerequisite: Eng 101. Required in Landscape Gardening, General Business, and Secretarial Training; freshman year; second term; 3 credits; 3 recitations. Fee \$0.25.

S. H. Peterson, H. Tucker, C. E. Henderlite, E. T. Arnesen

Eng 106. **Advanced Business English I.** Continuation of Eng 105. The preparation of single sales letters to different classes of customers; preparation of three types of sales letter series; study and writing of business promotion letters; business reports and form paragraphs; the study of correspondence supervision and of postal regulations.

Prerequisite: Eng 105 or equivalent. Required in General Business and in Secretarial Training; freshman year; third term; 3 credits; 3 recitations.

S. H. Peterson, H. Tucker, C. E. Henderlite, E. T. Arnesen

Eng 107. **Advanced Business English II.** A study of circular sales letters, advertising circulars (descriptive, narrative, explanatory, argumentative), house-organ articles, trade agreements, specifications, and timely articles on business subjects.

Prerequisite: Eng 106 or equivalent. Required in Advertising and Selling; senior year; first term; 3 credits; 3 recitations.

S. H. Peterson

Eng 201. **Advanced English Composition.** The object of this course is to develop facility and clarity of expression. Intensive study of the popular essay; of the biography and the criticism as special forms of exposition; exercises in analysis and in the application of the mechanics of expository outlines; long and short themes.

Prerequisites: Eng 101, 102, 103. Required in Agricultural Chemistry (senior year, first term); elective to others; sophomore or junior year; any term; 3 credits; 3 recitations.

S. H. Peterson

Eng 202. **Narrative Writing.** This course affords opportunity for (1) study and practice in narrative writing, with its main accessory, description; and (2) through this study and practice, a preliminary training for a more expeditious and thorough achievement of the course in short-story (Eng 213) offered the third term.

Prerequisites: Eng 101, 102, 103, or equivalent. Elective; sophomore or junior year; second term; 3 credits; lectures and recitations.

L. B. Baldwin

Eng 211. **The English Essay.** Study of structure of the essay; the essay as expression of national life and thought; the growth of the economic, critical, historical, and personal essay. Class and individual assignments from Macaulay, Arnold, Pater, Ruskin, Stevenson, Emerson, and others; lectures and reports.

Prerequisites: Eng 101, 102, 103, or equivalent. Elective; sophomore, junior, or senior year; first term; 3 credits; 3 recitations.

F. Berchtold

Eng 213. **The Short-Story.** Reading, study, and composition of the short-story as a distinct literary type; analysis of three prescribed stories emphasizing respectively plot, character, and setting. Lectures, recitations, tests.

Prerequisites: Eng 101, 102, 103, or equivalent. Elective; sophomore or junior year; third term; 3 credits; 4 recitations.

L. B. Baldwin

Eng 214. **The Novel.** Study of the structure and content of the realistic as well as the romantic novel; growth of the novel of manners, of character, of the problem novel; study of the modification, variation and persistence of the larger categories of fiction. Class and individual assignments, lectures, and reports.

Prerequisites: Eng 101, 102, 103. Elective; sophomore or junior year; second term; 3 credits; 3 recitations.

F. Berchtold

Eng 321. **English Literature I.** A general outline course in the history of English literature. The aim is to cultivate an appreciation of what is excellent in quality and form. Masterpieces representing the best thought and form are studied in class or assigned to students for careful reading and reports. Field of study: English literature from its beginning to the end of the eighteenth century.

Elective; junior or senior year; first term; 3 credits; 3 recitations.

F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 322. **English Literature II.** A continuation of Eng 321. Study of the master minds of the nineteenth century. Lectures, readings and discussion; critical reports on assigned topics required from all the students.

Elective; junior or senior year; second term; 3 credits; 3 recitations.

F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 323. **English Literature III.** English literature of the late nineteenth and the twentieth centuries.

Elective; third term; 3 credits; 3 recitations.

F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 431. **American Literature I.** Study of the growth and development of literature in our country from the earliest times to the middle of the nineteenth century. Lectures; class study; class reading; reports on assigned topics; essays.

Elective; junior or senior year; first term; 3 credits; 3 recitations.
F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 432. **American Literature II.** A continuation of Eng 431. The metropolitan writers; literature in the South; literature in the West; present schools and tendencies. Lectures; classroom work; reports; essays.

Elective; junior or senior year; second term; 3 credits; 3 recitations.
F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 433. **American Literature III.** A continuation of Eng 432. Study of American writers of the twentieth century, including important features of the literature of the Great War. Contemporary American periodical literature. Lectures; assigned readings; reports; essays.

Elective; junior or senior year; third term; 3 credits; 3 recitations.
F. Berchtold, J. M. Kierzek, E. T. Arnesen

Eng 441. **Tennyson.** A study of the man as representative poet of the nineteenth century and of his outlook upon life, together with an introduction to the study of poetry through a careful reading of his more significant poems.

Elective; junior or senior year; second term; 3 credits; 2 lectures; 1 recitation. Given alternate years. Offered 1925-26.

M. E. Smith

Eng 442. **Browning.** The most noteworthy of the shorter poems are read and carefully studied. The purpose of the course is to remove difficulties and to bring the student into touch with the robust, optimistic personality of the poet.

Elective; junior or senior year; second term; 3 credits; 2 lectures; 1 recitation. Given alternate years. Not offered 1925-26.

M. E. Smith

Eng 443. **Shakespeare.** A careful reading of plays of various types with a view to the forming of some estimate of the poet's genius and outlook. Attention is paid to the relation between the Elizabethan Drama and the modern play.

Elective; junior or senior year; second term; 3 credits; 2 lectures; 1 recitation.

M. E. Smith

Eng 444. **Present-Day American Poetry.** A survey of the most vital of the more recent work of present-day American poets, including Robert Frost, E. A. Robinson, Vachel Lindsay, E. L.

Masters, Amy Lowell, and a number of others. For comparison, brief notice will be given to such British poets as Hardy, Masefield, and Noyes.

Elective; junior or senior year; first term; 3 credits; 3 lectures.

M. E. Smith

Eng 445. **The English Drama.** A rapid survey of the development of the English Drama (exclusive of Shakespeare), with reading of plays illustrating the pre-Shakespearean period, the drama of Shakespeare's contemporaries, the Restoration, Goldsmith, Sheridan, and others to the revival of the late nineteenth century.

Elective; junior or senior year; first term; 3 credits; 2 lectures; 1 recitation.

M. E. Smith

Eng 446. **Contemporary English Drama.** A survey of dramatic activities from the revival in the last decade of the nineteenth century to the present time.

Elective; junior or senior year; third term; 3 credits; 2 lectures; 1 recitation.

M. E. Smith

Eng 481, 482, 483. **Continental European Literature.** Reading, analysis and discussion of the recognized masterpieces of continental European literature in approved translations; first term—French, Italian, Spanish; second term—Scandinavian, Teutonic; third term—Russian, Polish, Balkan.

Elective; three terms; 3 credits each term; 2 lectures; 1 recitation.

F. Berchtold

ENTOMOLOGY

The courses in Entomology are planned to acquaint the student with the proper relationship of Entomology to general agriculture; to train students for commercial honey production; to prepare students for state and Federal service in Economic Entomology, or as teachers of Entomology; and to meet the needs of students from other departments who desire work in Entomology. Three fields of advanced work are offered: Applied Entomology, Bee Culture, and Forest Entomology.

The general courses in Economic Entomology are designed to provide the student with a practical grasp of the principles of applied Entomology, including a knowledge of the commoner pests, their general habits and life-history, and the application of the most approved principles in insect-pest control.

The work in Bee Keeping consists of a two-year major in Bee Culture available to Agriculture students who desire this as a specialty or as a minor with poultry, horticulture, or dairying, etc.

The arrangement of the course is so planned that the student may take the first year's work or greater or lesser units with profit where not desirous or where impossible to continue the full two years. Other courses of shorter duration are planned to meet the special needs.

Forest Entomology includes a general consideration of the main insect groups and their relationships. An intensive study of the main groups of forest insects is made and practical investigation of forest areas is assigned in order to teach the type and extent of insect infestation, methods in forest surveys and in report writing, and the principles underlying forest insect control.

Advanced courses are planned to equip students specializing in Entomology with a fundamental groundwork in the science sufficient to prepare them for effective service in applied Entomology and to fit them for advanced research study.

Equipment. This department occupies rooms on the third floor of Agriculture Hall. The laboratories are equipped for teaching general Entomology and fairly well equipped for advanced research work. The entomology collections include a reference series of some 5000 determined species of insects, including a representative collection of Oregon material. A display of Ricker mounts and St. Louis boxes containing life-history studies of injurious forms and their typical injury are available. The College apiary consists of thirty full colonies of bees with sufficient supers and additional equipment to care for an average surplus crop. The entomological library comprises old volumes, complete sets of entomological periodicals, reports, and memoirs. Through the courtesy of the librarian of the United States Department of Agriculture students may borrow entomological literature from the library of the Department of Agriculture and the Congressional library.

COURSES

Ent 131, 132, 133. **Commercial Bee Culture.** Designed primarily for the student who contemplates taking up commercial honey production. The course includes a study of the selection and preparation of equipment; the biology and life-history of the honey-bee; honey flora; fall, winter, spring, and summer management; marketing; disease control.

Elective; three terms; 3 credits each term; 2 recitations; 1 three-hour laboratory period. Fee \$2.00 each term. *H. A. Scullen*

Ent 201. **Principles of Economic Entomology.** Designed primarily for Agriculture students. A consideration of typical eco-

conomic forms of insects in the principal orders and more important families, and of the principles of insect-pest control.

Prerequisite: ZP 130. Required in Agriculture; sophomore year; any term; 3 credits; 3 recitations; 1 two-hour laboratory period. Fee \$2.00. *W. J. Chamberlin, H. A. Scullen*

Ent 231, 232, 233. **Advanced Commercial Bee Culture.** Designed for students preparing for educational work in bee culture, inspection work, or extensive honey production. The course includes a study of apiary management, queen rearing, apiary inspection and disease control. Offered alternate years. Not offered 1925-26.

Prerequisites: Ent 131, 132, 133, or 333. Elective; senior year; three terms; 3 credits each term; 2 recitations; 1 three-hour laboratory period. Fee \$3.00 each term. *H. A. Scullen*

Ent 303. **General Entomology.** Collection, preservation, and elementary classification of insects. In field collecting, the economic aspects are emphasized. Life-history studies, the use of breeding cages, and practice in compiling field and laboratory notes receive attention.

Prerequisite: Ent 201. Required in Entomology; junior year; third term; 4 credits; 2 recitations; 2 two-hour laboratory periods. Fee \$3.00. *W. J. Chamberlin, H. A. Scullen*

Ent 321. **Forest Entomology.** An intensive study of insects injurious to forests and forest products, forest insect surveys, and the principles of forest insect control.

Elective; junior year; first term; 4 credits; 3 lectures or recitations; 1 two-hour laboratory period. Fee \$2.00.

W. J. Chamberlin

Ent 333. **Bee Culture.** A practical course in actual apiary manipulations designed primarily for students interested in Horticulture. The College has a small apiary where the simpler manipulations may be mastered.

Elective; junior year; third term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$3.00. *H. A. Scullen*

Ent 351. **Insect Morphology.** A study of the fundamentals of external, internal, and comparative morphology of insects including adaptive structures and their utility, and wing venation. Especial attention is given to structures used in classification.

Prerequisite: Ent 201. Required in Entomology; elective in Zoology; junior year; second term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$2.00. *D. C. Mote*

Ent 404. **Advanced Economic Entomology.** An intensive consideration of specific insect pests of farm, garden, and orchard par-

ticularly of the Northwest, and their control; latest developments in insecticides and their uses.

Prerequisite: Ent 201. Required in Entomology (junior year) and in Horticulture (senior year); elective to others; first term; 3 credits; 2 recitations or lectures; 1 three-hour laboratory period. Fee \$2.00. *D. C. Mote*

Ent 422. **Forest Entomology.** Continuation of Ent 321.

Prerequisite: Ent 321. Elective; senior year; second term; 3 credits; 2 recitations or lectures; 1 three-hour laboratory period. Fee \$2.00. *W. J. Chamberlin*

Ent 423. **Advanced Forest Entomology.** An intensive study of the bark beetles injurious to forest trees.

Prerequisites: Ent 321, 422, or equivalent. Elective; senior or graduate year; any term; 4 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$3.00. *W. J. Chamberlin*

Ent 424. **Forest Insect Problems.** Research work on special problems relating to forest insect control; life-history problems; preparation of bibliographies, etc.

Prerequisites: Ent 321, 422. Elective to senior or graduate students specializing in Forest Entomology; any term; credits and hours to be arranged. Fee \$3.00. *W. J. Chamberlin*

Ent 452. **Insect Taxonomy.** The collection, preservation, and classification of insects of the several orders; intensive study of insects of selected groups; attention to phylogenetic relationships and distribution.

Prerequisite: Ent 351. Required in Entomology; senior year; second term; 5 credits; 2 recitations; 2 three-hour laboratory periods. Fee \$3.00. *W. J. Chamberlin, H. A. Scullen*

Ent 453. **Insect Ecology.** A study of insects in relation to their surroundings, considering the interrelations of insects with each other and with other animals and plants; influence of climate and other natural phenomena upon the distribution and activities of insects and application of these factors to Economic Entomology.

Prerequisite: Ent 303. Required in Entomology; senior year; third term; 5 credits; 2 recitations; 2 three-hour laboratory periods. Fee \$3.00. *D. C. Mote*

Ent 473. **The Teaching of Entomology.** Designed primarily for high school teachers. The principles of Entomology including materials and methods.

Prerequisite: Bot 471. Elective; senior or graduate year; third term; 5 credits; 4 lectures; 1 three-hour laboratory period. Fee \$2.00.

Ent 481, 482, 483. **Seminar.** Reading, discussing, and abstracting of the leading articles on entomological topics as they appear in current scientific literature.

Required in Entomology; senior or graduate year; three terms; 1 credit each term. *D. C. Mote*

Ent 691, 692, 693. **Thesis and Graduate Study.** A course offered only for graduate students. Students select problems in Applied Entomology; problems in Insect Ecology; monographic problems, etc.; emphasis on methods in research.

Elective; graduate year; three terms; credits to be arranged.

D. C. Mote

HISTORY

A knowledge of history is fundamental to leadership. Courses in History are required in Commerce, Home Economics, Industrial Arts, and Vocational Education curricula and are elective in other curricula of the College. The instruction is given largely by lectures and discussions supplemented by the reference facilities of the College Library.

COURSES

Hst 124. **American Colonization.** A course dealing with the colonization of North America by the various European nations, with emphasis on the economic, social, and cultural life of the colonies before the Revolution.

Elective; first term; 3 credits; 3 recitations. *J. Ellison*

Hst 125. **American History.** Political, constitutional, and economic history of the United States from the Revolution to the Civil War.

Elective; first term; 3 credits; 3 recitations. *J. B. Horner*

Hst 126. **Recent History of the United States.** History of the United States of America from the Civil War to the present time. Various contemporary movements are discussed.

Required in Industrial Arts, Commerce, and Military Science and Tactics; third term; 3 credits; 3 recitations. *J. B. Horner*

Hst 211. **History of Western Civilization I.** A survey of the beginnings and development of Western civilization from the later Roman Empire to 1500 A.D., designed to meet the needs of students desiring a course in early European history.

Elective; first term; 3 credits; 3 recitations. *E. V. Vaughn*

Hst 212. **History of Western Civilization II.** A study of European development and expansion from 1500 to 1815 A.D.

Required in Industrial Arts, Home Economics (junior year), Commerce, and Military Science and Tactics (freshman or sophomore year); any term; 3 credits; 3 recitations.

E. V. Vaughn, J. Ellison

Hst 213. **History of Western Civilization III.** Europe from 1815 to the present time.

Required in Industrial Arts, Home Economics (junior year), Commerce, and Military Science and Tactics (freshman or sophomore year); any term; 3 credits; 3 recitations.

E. V. Vaughn, J. Ellison

Hst 331. **History of Latin America.** A study of the rise and progress of the Latin American nations.

Required in Military Science and Tactics; elective to others; junior or senior year; first or second term; 3 credits; 3 recitations.

J. Ellison

Hst 340. **History of Oregon.** Includes history of Old Oregon now known as the Northwest States. Five epochs: early explorations; fur trade and colonization; provisional government; territorial government; state government. Indian folk-lore; history of Oregon literature.

Elective; any term; 3 credits; 3 recitations.

J. B. Horner

Hst 351. **Representative Men and Women.** A study of American leaders of thought and action, as revealed in critical periods of the nation's history.

Elective; junior or senior year; second or third term; 3 credits; 3 recitations.

J. Ellison

Hst 361. **History of the Pacific Ocean Area.** The history of the activities of European peoples and of the United States in the Pacific Ocean and in Asia, together with a consideration of present conditions and problems within this area.

Elective; junior or senior year; first or third term; 3 credits; 3 recitations.

J. Ellison

Hst 411. **History of the British Empire.** A study of the historical development and present-day problems of the British Empire.

Required in Military Science and Tactics; elective to others; senior year; first term; 3 credits; 3 recitations.

E. V. Vaughn

Hst 421. **American Diplomatic History.** History of the chief events and developments in American foreign affairs.

Required in Military Science and Tactics; elective to others; senior year; second or third term; 3 credits; 3 recitations.

J. Ellison

Hst 431. Contemporary World History. Present-day developments as related to their historical antecedents and causes, and a study of the laws of evidence involved in evaluating current movements and events. Readings, reports, and conferences.

Prerequisites: Hst 212, 213. Elective; junior or senior year; second or third term; 3 credits; 3 recitations. *E. V. Vaughn*

MATHEMATICS

COURSES

Mth 101a. Introduction to the Mathematical Theory of Interest. Simple and common interest, relation between normal and effective rates, present worth and discount, logarithms, series and annuities.

Prerequisite: two units of high school mathematics, one of which must be Algebra. Required in Finance and Administration; freshman year; any term; 2 credits; 3 recitations.

Mth 101b. Introduction to the Mathematical Theory of Interest. Laboratory instruction on calculating machines. To be taken in conjunction with Mth 101a.

Required in Finance and Administration; freshman year; any term; 1 credit; 1 two-hour laboratory period. Fee \$0.25.

Mth 102. Mathematics of Investment. Applications of the mathematical theory of interest and annuities to the amortization of interest-bearing debts, the valuations of bonds and other securities, sinking funds, depreciation, the operations of building and loan associations, and the Federal Land Bank System.

Prerequisite: Mth 101. Required in General Business; freshman year; any term; 3 credits; 3 recitations.

F. C. Kent, F. E. Young

Mth 103. Introduction to Mathematics of Insurance. The theory of probability, applications of annuities and probability to the calculations of life insurance premiums, policy valuations, and policy reserves.

Prerequisites: Mth 101, 102. Required in Finance and Administration; freshman year; any term; 3 credits; 3 recitations.

Mth 104. Advanced Calculating Machine Course. Instruction given on standard types of calculating machines with a view to practical office work.

Prerequisite: Mth 101. Elective; third term; 2 credits; 6 one-hour laboratory periods.

Mth 111. Plane Trigonometry. This course includes functions of acute angles, right angles, functions of any angle, relations between functions, inverse functions, trigonometric equations, and oblique triangles. Considerable time is devoted to the deduction of trigonometric formulae, study of trigonometric identities, and the solution of practical problems.

Required in Engineering; freshman year; any term; 4 or 5 credits; 5 recitations. *N. Tartar, H. L. Beard, J. A. van Groos, G. A. Williams*

Mth 121. College Algebra. A course for freshmen in Engineering who need further preparation in Algebra.

Freshman year; second or third term; 4 credits; 5 recitations. *E. B. Beaty*

Mth 131. Elementary Analysis. Review of Algebra including radical expressions, quadratic equations, binomial theorem, progressions, and complex numbers. Other subjects studied are functions and graphs, differentiation.

Required in Engineering and Mines (5 credits) and in Forestry (4 credits); freshman year; any term; 5 recitations.

E. B. Beaty, N. Tartar, H. L. Beard, J. A. van Groos, G. A. Williams

Mth 132. Elementary Analysis. The point, straight line, circle, conic sections, and some of the higher plane curves are studied. Considerable time is given to the plotting of curves in both rectangular and polar coordinates.

Required in Engineering and Mines (5 credits) and in Forestry (4 credits); freshman year; any term; 4 recitations.

E. B. Beaty, N. Tartar, H. L. Beard, J. A. van Groos, G. A. Williams

Mth 201, 202, 203. College Mathematics. These courses include portions of plane trigonometry, selected topics in advanced algebra, and a considerable amount of the elementary portions of the calculus, comprising a coherent year's work in college mathematics. Primarily, the aim is preparation for advanced work in applied mathematics, statistics, insurance, biology, and economics. But in both subject-matter and methods of presentation the cultural value of mathematics is by no means neglected.

Prerequisite: $2\frac{1}{2}$ units of high school mathematics or 2 units of high school and one term of college mathematics. Elective; freshman or sophomore year; 3 terms; 3 credits each term; 3 recitations. *F. C. Kent*

Mth 251. Differential Calculus. Differentiation; simple applications of the derivative; successive differentiation; maxima and

minima; points of inflection; curve tracing; differentials; rates; change of variable; indeterminate form; partial differentiation.

Required in Engineering; sophomore year; any term; 4 credits; 5 recitations.

*C. L. Johnson, E. B. Beaty, J. A. van Groos,
H. L. Beard, G. A. Williams*

Mth 252. Integral Calculus. Standard forms of integrations; integration of trigonometric differentials; constant of integration; the definite integral; integration of rational fractions.

Required in Engineering; sophomore year; any term; 4 credits; 5 recitations

*C. L. Johnson, E. B. Beaty, J. A. van Groos,
H. L. Beard, G. A. Williams*

Mth 253. Integral Calculus. A continuation of Mth 252. Integration by rationalization; integration as a process of summation with applications; successive integration; ordinary differential equations.

Required in all Engineering curricula except Mining; sophomore year; any term; 4 credits; 5 recitations.

C. L. Johnson, E. B. Beaty, J. A. van Groos, G. A. Williams

Mth 301, 302. Mathematics of Statistics. The collection and tabulation of data; graphic representation of data, frequency distributions, averages, standard deviation, correlation, curves of regression and probable error of mean. For students majoring in Economics, Biology, Vocational Education, or Farm Management.

Prerequisites: Mth 201, 202, 203, or equivalent. Elective; junior year; first and second terms; 3 credits each term; 3 recitations.

F. C. Kent

Mth 303. Mathematics of Insurance (Advanced Course). This course deals with the mathematical calculations involved in actuarial theory and investment problems from an insurance standpoint.

Prerequisites: Mth 201, 202, 203. Elective; junior year; third term; 3 credits; 3 recitations.

F. C. Kent, F. E. Young

Mth 361. Differential Equations. Study of the solution of ordinary and partial differential equations which the Engineering student is likely to encounter.

Prerequisites: Mth 251, 252, 253. Elective; junior year; first or third term; 4 credits; 4 recitations.

E. B. Beaty

Mth 381. Hyperbolic Functions.

Prerequisites: Mth 251, 252, 253, 361. Elective; junior or senior year; third term; 3 credits; 3 recitations.

E. B. Beaty

MODERN LANGUAGES

The department of Modern Languages offers four years of work in French, German, and Spanish.

In harmony with all other courses of the College, the final aim of the instruction is practical use in the various spheres of activity and pursuits of life. While the disciplinary and cultural values of language study are duly recognized and emphasized, the predominant purpose is the development of personal power for social service.

A certain amount of specified work in a language is definitely required in some curricula. In other curricula, German, French, and Spanish may be taken as electives, and when so taken the student receives full credit for any term's work. Elementary classes are formed at the beginning of the first and second terms. Students who have had one year's work in high schools should register for the third term of Elementary classes. Students who have had two years' work in high schools should register for the first term of Intermediate classes. All students who have had more than two years' work should confer with the head of the department before registering.

COURSES**FRENCH**

ML 111. Elementary French. Drill in the rudiments of the language; oral and written exercises; idiomatic translations; reading of easy selections.

Elective; any year; first or second term; 3 credits; 3 recitations.

ML 112. Elementary French. Continuation of ML 111.

Prerequisite: ML 111 or equivalent. Elective; any year; second term; 3 credits; 3 recitations.

ML 113. Elementary French. Continuation of ML 112.

Prerequisite: ML 112 or equivalent. Elective; any year; third term; 3 credits; 3 recitations.

ML 211, 212, 213. Intermediate French. Advanced grammar; irregular verbs; subjunctive mode; reading of narrative, descriptive, and historical prose; oral exercise on texts read.

Prerequisites: ML 111, 112, 113, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

ML 311, 312, 313. Advanced French. Reading of scientific, technical, and miscellaneous texts with corresponding composition and conversation.

Prerequisites: ML 211, 212, 213, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

ML 411, 412, 413. **Advanced French.** Planned especially for prospective teachers of French and others desiring to acquire a comprehensive knowledge of the language. Advanced composition; reading of advanced texts of various classes of literature; oral and written reports.

Prerequisites: ML 311, 312, 313, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

SPANISH

ML 121. **Elementary Spanish.** Essentials of vocabulary and grammar; auxiliaries, regular and radical changing verbs, and some of the more common irregular forms; reading of easy prose selections; idiomatic translations; much oral drill and conversation.

Elective; any year; first or second term; 3 credits; 3 recitations.

ML 122. **Elementary Spanish.** Continuation of ML 121.

Prerequisite: ML 121 or equivalent. Elective; any year; second term; 3 credits; 3 recitations.

ML 123. **Elementary Spanish.** A continuation of ML 122.

Prerequisite: ML 122 or equivalent. Elective; any year; third term; 3 credits; 3 recitations.

ML 221, 222, 223. **Intermediate Spanish.** Grammar continued; irregular verbs; subjunctive mode in all its uses; idiomatic phrases; social and epistolary forms; reading of suitable texts; oral and written exercises.

Prerequisites: ML 121, 122, 123, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

ML 321, 322, 323. **Advanced Spanish.** Reading of commercial texts; commercial correspondence; descriptive and technical prose; much conversation.

Prerequisites: ML 221, 222, 223, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

ML 421, 422, 423. **Advanced Spanish.** Especially for prospective teachers and others desiring a comprehensive knowledge of Spanish. Advanced composition; reading of advanced texts of the various classes of literature; oral and written reports.

Prerequisites: ML 321, 322, 323, or equivalent. Elective; any year; three terms; 3 credits each term; 3 recitations.

GERMAN

ML 131. Elementary German. Rudiments of the language; oral and written exercises; translation of easy selections.

Elective; first or second term; 3 credits; 3 recitations.

ML 132. Elementary German. Continuation of ML 131.

Prerequisite: ML 131 or equivalent. Elective; second term; 3 credits; 3 recitations.

ML 133. Elementary German. Continuation of ML 132.

Prerequisite: ML 132 or equivalent. Elective; third term; 3 credits; 3 recitations.

ML 231, 232, 233. Intermediate German.

Prerequisite: ML 131, 132, 133, or equivalent. Elective; three terms; 3 credits each term; 3 recitations.

ML 331, 332, 333. Advanced German.

Prerequisites: ML 231, 232, 233, or equivalent. Elective; three terms; 3 credits each term; 3 recitations.

ML 431, 432, 433. Advanced German.

Prerequisites: ML 331, 332, 333, or equivalent. Elective; three terms; 3 credits each term; 3 recitations.

PHYSICS

The department seeks to adapt each course to the needs of those enrolled in it. To attain this end the work in General Physics has been subdivided into several courses that suit the needs of the various technical schools of the College. These courses all cover the customary range of subjects: mechanics, sound, heat, light, electricity and magnetism, and all naturally emphasize the same fundamental principles; they differ in the relative amounts of time devoted to the several subjects and in the practical applications that are studied.

The advanced courses are built up on the same general scheme as the general courses; each emphasizes the fundamental principles in its field and puts stress upon practical applications both in lecture and in laboratory.

A course in astronomy is taught by the department because it was best fitted to undertake this work when demand arose for a general course in this subject.

Equipment. The department has a good supply of lecture demonstration apparatus and of general laboratory apparatus that enables the students to verify quantitatively the most important laws, to determine accurately some of the physical properties of

substances, and also to obtain practice in the use and care of the common measuring instruments. For advanced work, the department is well equipped in electrical measurements, photometry, photography, and radio communication.

In the general library are many recent Physics texts and allied works, as well as a number of Physics periodicals, which are available to all.

COURSES

Ph 101, 102. **General Physics.** A brief course in general physics.

Prerequisite: Geometry. Required in Horticultural Products (junior year); optional in Agriculture and Commerce (sophomore year); first and second terms; 3 credits each term; 5 periods. Fee \$2.00 each term. *A. W. Marker*

Ph 111, 112, 113. **Engineering Physics.** A course in general physics adapted to students in Engineering. Trigonometry must precede or accompany this course.

Required in Electrical Engineering (freshman year) and in Industrial Arts and Forestry (sophomore year); three terms; 3 credits each term; 2 lectures; 2 recitations; 1 two-hour laboratory period. Fee \$2.00 each term.

W. B. Anderson, H. T. Drill, and others

Ph 121, 122, 123. **General Physics.** A course adapted to the needs of students in Pharmacy, especially those preparing to study medicine.

Prerequisite: Geometry. Required in Pharmacy; freshman year; three terms; 4 credits each term; 2 lectures; 3 recitations; 1 two-hour laboratory period. Fee \$2.00 each term.

A. W. Marker

Ph 161. **Commercial Amateur Finishing.** A course designed especially for students in Pharmacy aiming to be of assistance in selling cameras and photographic accessories and to give experience in modern methods of printing and developing on a commercial scale.

Elective; first or second term; 1 credit; 1 recitation; 1 two-hour laboratory period. Fee \$3.00.

Ph 163. **Rudiments of Photography.** A manipulating course intended for students in Landscape Gardening and others not having the necessary scientific prerequisites to enter the course in Introductory Photography (Ph 361).

Elective; first or third term; 2 credits; 1 lecture; 4 periods practical work.

Ph 202, 203. **General Physics.** A brief descriptive course with such applications as are of greatest interest to students in Home Economics.

Required in Home Economics (Professional Curriculum); sophomore year; second and third terms; $2\frac{1}{2}$ credits each term; 1 lecture; 2 recitations; 1 two-hour laboratory period. Fee \$2.00 each term.

Ph 221, 222, 223. **Physics.** Courses in general Physics adapted to students who are taking Calculus. Calculus must precede or accompany these courses.

Prerequisite: Trigonometry. Required in Chemical, Civil, Mechanical, and Mining Engineering; sophomore year; three terms; 3 credits each term; 5 one-hour periods. Fee \$2.00 each term.

W. Weniger, F. B. Morgan

Ph 224. **General Physics.** A course in Light and Electricity intended to accompany Ph 223.

Required in Mines; sophomore year; third term; 3 credits; 2 laboratory periods. Fee \$2.00.

W. Weniger

Ph 243. **Descriptive Astronomy.** A brief elementary course covering the most important points relating to the heavenly bodies. Descriptive rather than mathematical in character.

Elective; sophomore year; third term; 3 credits; 3 recitations or their equivalent in lectures and observational work, depending upon weather conditions. Fee \$2.00.

W. B. Anderson

Ph 311, 312. **Engineering Physics.** A second-year course in heat, light, and electricity.

Prerequisites: Ph 221, 222, 223. Elective; junior year; first and second terms; 3 credits each term. Fee \$2.00.

Ph 353. **Radio Communication.** A study of the discoveries leading up to the practical application of electric waves to telegraphy; theory of modern radio transmission and receiving systems, including the wireless telephone. Laboratory measurements of inductance, capacity, and wave lengths; assembling and tuning complete transmitting and receiving sets; code practice. Laboratory sections limited to six students each.

Prerequisite: Ph 223 or equivalent. Elective; sophomore, junior, or senior year; first or third term; 3 credits; 2 lectures; 2 recitations; 1 two-hour laboratory period. Fee \$2.00.

J. Jordan

Ph 361. **Introductory Photography.** A course designed to acquaint the student with photographic processes. Emphasis is placed upon the theoretical as well as the practical side of the subject. Students are taught the proper use of the hand camera in

negative making, certain positive processes, enlarging, lantern slide making, the preparation of different stock solutions, etc.

Prerequisites: College Physics and Chemistry. Elective; first or third term; 3 credits; 1 lecture; 1 recitation; 4 hours of practical work. Fee \$5.00.

J. C. Garman

Ph 362. **Commercial Photography.** A continuation of Ph 361 with emphasis on commercial work. The work includes such topics as copying, flashlights, interiors, photo-microscopy, the air-brush, blocking negatives, the uses of contrast filters, making of multiple plate panoramas, photographing furniture and various other commercial articles, coloring, etc.

Prerequisite: Ph 361. Elective; second term; 3 credits; 1 lecture; 1 class discussion; 4 hours of practical work. Fee \$5.00.

J. C. Garman

Ph 363. **Pictorial Photography.** A continuation of Ph 361 with emphasis on pictorial work. Soft focus landscape work, and special work in enlarging. A study is made of the various pictorial mediums such as carbon, platinum, bromoil, etc.

Prerequisite: Ph 361. Elective; third term; 3 credits; 1 lecture; 1 class discussion; 4 hours of practical work. Fee \$5.00.

J. C. Garman

Ph 431. **Acoustics.** A study of the acoustics of buildings.

Prerequisite: College Physics. Elective; junior or senior year; first term; 2 credits; 2 periods.

F. B. Morgan

Ph 452. **Advanced Radio.** An intensive study of the thermionic vacuum tube and related phenomena.

Prerequisites: Ph 353 and Calculus. Elective; junior or senior year; second term; 3 credits; 2 recitations; 1 two-hour laboratory period. Fee \$2.00.

J. Jordan

Ph 461. **Color Photography.** A study of the chief processes of color photography; intended to be of assistance in special phases of botany, horticulture, entomology, photomicrography, clinical photography, etc.

Prerequisites: Ph 361, 362. Elective; first term; 2 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$4.00.

J. C. Garman

Ph 462. **Advanced Photography.** Special work in photography for students who have taken all the other courses in this subject and desire additional training and assistance. Suggested topics include retouching, use of the air-brush, large prints, home portraiture, illumination, photomicrography.

Prerequisite: Ph 362 or 363. Elective; second term; three credits; 1 lecture; 1 class discussion; 4 hours practical work. Fee \$6.00. *J. C. Garman*

Ph 472. **The Physics of Light Production.** A course on radiation and the development of modern illuminants.

Prerequisites: Ph 221, 222, 223 or equivalent. Elective; senior year; second term; 3 credits; 2 recitations; 1 two-hour laboratory period. Fee \$2.00. *W. Weniger*

Ph 473. **Photometry.** A course in the theory and use of both precision and portable photometers, including the spectrophotometer.

Prerequisites: Ph 221, 222, 223 or equivalent. Elective; senior year; third term; 3 credits; 1 lecture; 1 recitation; 2 two-hour laboratory periods. Fee \$2.00. *W. Weniger*

Ph 481. **Recent Developments in Electricity.** A course embodying some of the recent electrical discoveries that are of interest to the engineer, but that are not discussed in any of the courses in Electrical Engineering.

Elective; senior year; first term; 3 credits; 2 lectures; 2 recitations; 1 two-hour laboratory period. Fee \$2.00. *W. Weniger*

Ph 611, 612, 613. **Seminar.** A discussion of current literature and special topics.

Elective; graduate year; 3 terms; 1 credit each term; 1 period.

Ph 614. **Physical Measurements.** A course in those physical measurements that are of particular value to graduate students in the various technical schools.

Elective; graduate year; any term; 3 credits. The particular field covered will depend upon the class.

PUBLIC SPEAKING AND DRAMATICS

The purpose of this department is to aid students in the development of clear, original thinking and to give training in the correlation and organization 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 in aiding to build up a strong personal address.

The department offers not only courses that are designed to develop an appreciation of the best in reading and speaking, but also courses that are planned to suit the practical needs of the student.

While the work is adapted to the student who must get a maximum of platform experience in a few months, the courses are so correlated that one may secure progressive training covering a period of three years if he so desires.

Many plays, intramural and intercollegiate debates, extempore speaking, and oratorical contests take place on the campus each year, and the department offers courses and much individual attention to students who wish to prepare for such work.

Speech Correction. The department offers work for those who are handicapped with the various speech impediments, such as stammering, stuttering, and lispings. An attempt is made to understand the factors in the life of the individual which have caused his emotional difficulties, and when they are located an attempt is made to eradicate them. Students wishing to take this work register in PSp 254. They are placed in a separate group, a portion of the time being devoted to individual conferences during which their particular difficulties receive special consideration.

COURSES

PSp 254. Practical Public Speaking I. Practice in the development and presentation of speeches on topics of special interest to the students; voice training; vocabulary building and pronunciation; some study of gesture, bearing, and elements of effectiveness in presentation; criticism on organization of material. Organization is stressed.

Required in Agriculture and Vocational Education; elective to others; sophomore, junior, or senior year; any term; 3 credits; 3 recitations.

C. B. Mitchell, P. L. Edwards, E. W. Wells, H. A. Seering

PSp 255. Practical Public Speaking II. Practice in the construction and presentation of forms of addresses for special occasions; continuation of vocabulary building, pronunciation, voice training, and study of gesture and elements of effectiveness in delivery; criticism on organization and presentation. Delivery is stressed during this term. Some collateral reading.

Prerequisite: PSp 254. Elective; sophomore year; any term; 3 credits; 3 recitations.

C. B. Mitchell, P. L. Edwards, E. W. Wells

PSp 256. Practical Public Speaking III. A continuation of PSp 255. A study of the principles of interpretation as applied to practical public speaking. Intensive drill is given in the technique of delivery. A practical course for students who have had PSp 254 and 255.

Prerequisites: PSp 254, 255. Elective; sophomore or junior year; first or second term; 3 credits; 3 recitations. *P. L. Edwards*

PSp 257. Argumentation. Consideration of the theory of argumentation. Practical work in brief-drawing, collection and handling of evidence, and construction of the argumentative speech. Each student constructs several briefs and delivers several speeches. Criticism on presentation and construction.

Prerequisite: PSp 254. Elective; sophomore year; any term; 3 credits; 3 recitations. *C. B. Mitchell, E. W. Wells*

PSp 258. Advanced Public Speaking. Construction and presentation of the extended address. Each student prepares and presents several long speeches. The psychology of public speaking is considered. Criticism on delivery and organization of material. Assigned readings. Students should confer with the instructor before electing this course. Limited to ten students.

Prerequisites: PSp 254, 255. Elective; sophomore year; third term; 3 credits; 3 recitations. *C. B. Mitchell*

PSp 264. Expression. Literary analysis; interpretation of narrative and descriptive literature; foundation of voice and breath control; pantomime; diction; correction of erroneous habits of speech; correction of artificiality, affectation, and self-consciousness.

Elective; any term; 2 credits; 2 recitations. *Elizabeth Barnes*

PSp 265. Expression. Continuation of PSp 264. Voice; breath control; pantomime; impersonation; monolog; dialect; platform deportment.

Prerequisite: PSp 264. Elective; second or third term; 2 credits; 2 recitations. *Elizabeth Barnes*

PSp 266. Literary Interpretation. Continuation of PSp 264, 265. Interpretation of prose and poetry; expressive voice; resonance, pitch, tempo; platform deportment.

Prerequisites: PSp 264, 265; 3 credits; 3 recitations; first or third term. *Elizabeth Barnes*

PSp 267, 268. Story Telling. Study of children's literature; analysis and retelling of short stories suitable for nursery, kindergarten, and primary grades, intermediate grades, and playground; dramatization of stories. It is recommended that students take as prerequisites PSp 264, 265.

Elective; second and third terms; 2 credits each term; 2 recitations. *Elizabeth Barnes*

PSp 350. Parliamentary Drill. This course covers the history and principles of parliamentary usage and gives each student an

opportunity to serve as chairman of several meetings during the term. Much practice will be afforded in the presentation of motions and in impromptu speaking under the supervision of a critic. Assigned readings.

Elective; any term; 3 credits; 3 recitations. *E. W. Wells*

PSp 351. Oratory. A course designed for those who wish to enter oratorical work. Lecture and text-book work on the theory and technique of oratory; classroom exercises on the delivery of orations; preparation of original orations; study of classic and collegiate orations; personal conferences and criticism.

Prerequisites: PSp 254, 255. Elective; sophomore or junior year; first term; 3 credits; 3 recitations. *P. L. Edwards*

PSp 357, 358, 359. Debating. Application of the principles of argumentation to debating; analysis and brief-drawing. Each student participates in several debates. Criticism on delivery and on the selection and handling of evidence in both constructive argument and refutation. Assigned readings.

Prerequisites: PSp 254, 257. Elective; sophomore, junior or senior year; three terms; 3 credits each term; 3 recitations.

C. B. Mitchell, E. W. Wells

PSp 461. Dramatic Interpretation. Interpretation, cutting, arranging, and preparing plays for platform interpretation; advanced work in voice; expressive body; platform art.

Prerequisites: PSp 264, 265, 266. Elective; first or third terms; 3 credits; 3 recitations. *Elizabeth Barnes*

PSp 465. Community Drama I. Designed to meet the needs of community leaders. The study of plays suitable for use in the school or the community; selecting and directing pageants, etc.; bibliography; acting. As a part of this course three one-act plays are presented by the class in the Workshop theater. It is suggested that students take PSp 264, 265.

Elective; first or second term; 3 credits; 3 recitations.

C. B. Mitchell, Elizabeth Barnes

PSp 466. Community Drama II. Continuation of PSp 465. Laboratory work in stage craft; construction of simple and practical scenery for model stage; make-up, lighting, costuming, stage managing and directing; acting.

Prerequisite: PSp 465. Elective; second or third term; 3 credits; laboratory periods. *C. B. Mitchell, Elizabeth Barnes*

PSp 467. Community Drama III. Continuation of PSp 466. Advanced laboratory work; play production, staging, etc. Students desiring this course must make special arrangements with the

Head of the Public Speaking department. This course is open only to students who show special interest and ability in Dramatics.

Elective; any term; 3 credits; hours to be arranged.

C. B. Mitchell, Elizabeth Barnes

ZOOLOGY AND PHYSIOLOGY

The courses in the department are adapted to the particular needs of students in Agriculture, Pharmacy, Home Economics, Vocational Education, Physical Education, and Forestry. Opportunity is offered for advanced study or research in the various branches of Zoology and Physiology. The prescribed work for students in Pharmacy satisfies the pre-Medical requirements for entrance into medical school.

Equipment. The laboratories, museum, and offices of the department are situated on the third floor of Agriculture Hall. These are equipped with microscopes, charts, specimens, and other necessary materials for the efficient conduct of the work in Zoology and Physiology.

COURSES

ZP 101, 102, 103. **General Zoology.** The fundamental problems of zoology. During the third term, particular attention is paid to vertebrate structures.

Required in Pharmacy (freshman year) and Vocational Education (sophomore year); elective to others; three terms; 3 credits each term; 2 lectures; 1 three-hour laboratory period. Fee \$2.00 each term.
N. Fasten and assistants

ZP 130. **Principles of Zoology.** The distribution, habits, and functions of animals with reference to their economic importance.

Required in Agriculture; freshman year; any term; 5 credits; 3 lectures; 2 three-hour laboratory periods. Fee \$3.50.

H. M. Wight

ZP 142. **Fur Farming.** The practical methods in the propagation of fox and other fur-bearing animals. Emphasis is laid on the location and equipment of the ranch; the feeding and breeding of the animals; the care of the young; the common diseases and their control. Special consideration is given to the purchase and sale of stock.

Prerequisite: ZP 102 or 130, or equivalent. Elective; second term; 3 credits; 3 lectures. Fee \$0.50.

H. M. Wight

ZP 211, 212, 213. **Mammalian Anatomy.** Study of mammalian organization as a basis for the understanding of the human body. The laboratory work consists of some anatomy, histology, and embryology of a typical mammal.

Prerequisites: ZP 101, 102, 103, or equivalent. Required in Pharmacy; elective to others; sophomore year; three terms; 3 credits each term; 2 lectures; 1 three-hour laboratory period. Fee \$2.00 each term.
J. L. Osborn, W. D. Courtney

ZP 223. **Economic Ornithology.** A study of the birds of Oregon with emphasis on their importance as destroyers of organisms which are injurious to grains and fruits.

Elective; third term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$1.50.
Florence Hague

ZP 243. **Fish and Game Propagation.** Lecture, laboratory and field course dealing with the propagation of fish and food animals of the field, forest, or farm. Special attention to the question of the utilization of farm streams and ponds for the rearing of fish and other valuable water-dwelling animals.

Prerequisite: ZP 102 or 130, or equivalent. Elective; third term; 3 credits; hours to be arranged. Fee \$1.50.
H. M. Wight

ZP 300. **Histology.** A study of the various tissues of animals with emphasis on mammalian structures. Training in micro-technique, killing, fixing, imbedding, sectioning, and mounting of tissues. Given alternate years, alternating with ZP 310. Given 1925-26.

Prerequisite: ZP 103 or equivalent. Elective; junior or senior year; third term; 5 credits; 2 lectures; 3 three-hour laboratory periods. Fee \$3.00.
Florence Hague

ZP 310. **Embryology.** The development of animals, with special reference to the frog, chick, and pig. Given alternate years, alternating with ZP 300. Not given 1925-26.

Prerequisite: ZP 103, or equivalent. Elective; junior or senior year; third term; 5 credits; 2 lectures; 3 three-hour laboratory periods. Fee \$3.00.
Florence Hague

ZP 321, 322. **Elements of Physiology.** The object of this course is to give the student a knowledge of the processes and anatomical relationships which are necessary in maintaining the highest efficiency of the human body. Separate laboratory sections will be arranged for students who have had the chemistry prerequisite and for those who have not.

Prerequisites: Ch 222, 223, or their equivalent for students in Home Economics Professional Curriculum; no prerequisites for others. Required in Home Economics; elective to others; junior

year; first and second terms; 3 credits each term; 2 lectures; 1 three-hour laboratory period. Fee \$2.50 each term.

Florence Hague

ZP 331. Taxidermy and Zoological Collecting. Laboratory and field course in the methods involved in the preparation of skins and the preservation of museum specimens; study and practice in the methods involved in field survey work.

Prerequisite: ZP 102 or 130, or equivalent. Elective; first term; 3 credits; periods to be arranged. Fee \$4.00. *H. M. Wight*

ZP 351. Genetics. A lecture course dealing with the fundamental principles of variation and heredity as applied to animal and plant breeding.

Prerequisite: One term of Botany or Zoology, or equivalent. Required in Agriculture; elective to others; junior or senior year; first term; 3 credits; 3 lectures. Fee \$0.50. *N. Fasten*

ZP 353. Evolution and Eugenics. A lecture course dealing with the various ideas concerning the origin, development, and relation of organisms, with emphasis on human welfare.

Prerequisite: One term of Botany or Zoology, or equivalent. Elective; junior or senior year; third term; 3 credits; 3 lectures. Fee \$0.50. *N. Fasten*

ZP 362. Animal Parasites. A study of the role played by the lower animals in the production of disease.

Prerequisite: ZP 102 or 130, or equivalent. Required in Zoology; elective to others; junior year; second term; 3 credits; hours to be arranged. Fee \$2.00. *N. Fasten*

ZP 681, 682, 683. Zoological Seminar. Current problems in Zoology. The instructional staff and advanced students in the department attend and contribute original articles or abstracts of papers published in the current biological journals.

Required in Zoology; senior or graduate year; three terms; one credit each term; 1 period.

ZP 691, 692, 693. Thesis and Graduate Study. Opportunity is given students who desire to specialize in Zoology or Physiology to take up work not given in the regular courses, or to undertake the investigation of special problems under the direction of one of the instructors in the department. Either major or minor work for the master's degree may be carried in this department. Prerequisites, credits, etc., to be arranged by the instructor in charge, subject to the approval of the head of the department.

Required in Zoology; elective to others; senior year; 3 terms; credit to be arranged.

School of Commerce

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.

JOHN ANDREW BEXELL, A.M., Dean of the School of Commerce; Professor of Commercial Education.

LEILA HAY, Acting Secretary of the School of Commerce.

Commercial Education

JOHN ANDREW BEXELL, A.M., Professor of Commercial Education.

BERTHA ALICE WHILLOCK, B.S., Supervisor of Practice Teaching in Commerce.

JEAN ELIZABETH VANCE, B.S., Critic Teacher in Commercial Education.

Economics and Sociology

HECTOR MACPHERSON, Ph.D., Professor of Economics and Sociology; Director of Organization and Markets.

NEWEL HOWLAND COMISH, M.S., Professor of Economics and Sociology.

WILLIAM HENRY DREESEN, Ph.D., Associate Professor of Economics and Sociology.

EDWARD BECKER MITTELMAN, Ph.D., Assistant Professor of Economics and Sociology.

MERCY JANE GAIN, M.S., Assistant Professor of Economics and Sociology.

JAMES FRANKLIN PAGE, M.A., Instructor in Economics and Sociology.

VICTOR PIERPONT MORRIS, M.A., Instructor in Economics and Sociology.

CALVIN JEHU HURD, Extension Specialist in Marketing.

Finance and Administration

ALFRED SCHMITT, Ph.D., Professor of Finance and Administration.

HERBERT TOWNSEND VANCE, B.S., Professor of Advertising and Selling.

CHESTER FREDERIC LAY, A.M., Associate Professor of Accounting and Management.

LEE CLEVELAND BALL, B.S., Assistant Professor of Accounting.

FRANK LESLIE ROBINSON, Assistant Professor of Accounting.

JAMES HAROLD IRVINE, M.B.A., Instructor in Accounting.

ERNEST EVERTON BOSWORTH, B.A., C.P.A., Lecturer in Accounting.

WALTER RALEIGH ROBERTSON, B.A., C.P.A., Specialist in Accounting and Income Tax.

Political Science

- ULYSSES GRANT DUBACH, Ph.D., Professor of Political Science.
FRANK ABBOTT MAGRUDER, Ph.D., Associate Professor of Political Science.
ROY RENO HEWITT, Ph.B., LL.B., M.A., Assistant Professor of Political Science.
ROY MERLE LOCKENOUR, J.D., Instructor in Political Science.
EDITH WILKINSON, B.S., Assistant in Political Science.

Secretarial Training

- HERBERT TOWNSEND VANCE, B.S., Head, Department of Secretarial Training; Professor of Advertising and Selling.
ETHA MABEL MAGINNIS, Assistant Professor of Secretarial Training.
BERTHA ALICE WHILLOCK, B.S., Instructor in Secretarial Training.
LILLIAN BURNS, B.S., Instructor in Stenography.
MINNIE DEMOTTE FRICK, Instructor in Secretarial Training.
KATHLEEN MELOY, B.S., Instructor in Secretarial Training.
FREDA CARBAUGH, B.S., Instructor in Secretarial Training.
JAY WILSON CUMMINGS, B.S., Instructor in Secretarial Training.
LILLY MAGNHILD NORDGREN, B.S., Assistant in Secretarial Training.

Special Lecturers

About twenty special lecturers, chiefly prominent business and professional men throughout the state, deliver addresses during the year. The lectures, which are usually held under the auspices of the O. A. C. Chamber of Commerce, or one of the honor societies, are open to all students of the institution.

Degree Curriculum. The School of Commerce offers a four-year curriculum leading to the degree of Bachelor of Science in Commerce. Both the theoretical and the practical sides of every subject are emphasized, the constant aim being to train the student for service, efficiency, and business leadership.

Lower classmen may emphasize accounting, salesmanship, or secretarial studies, the last including stenography and office practice. In the junior year, the student may begin specialization in one of the following: (1) Accounting and Management, (2) Advertising and Selling, (3) Banking and Finance, (4) Commercial Education, (5) Economics and Sociology, (6) General Business, (7) Markets and Marketing, (8) Marketing of Agricultural Products, (9) Political Science, (10) Secretarial Training. In addition to the foregoing options, a liberal range of general electives is offered, so that in the junior or senior year, men may elect minors in Agri-

culture, Forestry, or Industrial Arts, while women may elect minors in Home Economics or Physical Education.

Graduate Curriculum in Agricultural Economics and Rural Sociology. Course sequences will be outlined leading to the degree of Master of Science in Agricultural Economics and Rural Sociology.

The aim is to make the graduate work in this field fit students for positions as county agriculturists, positions in the United States Department of Agriculture, especially in the Bureau of Markets, teachers in colleges and rural high schools, and for rural leadership in general. Students are also prepared for civil service examinations in this general field.

Preparation for Teaching. Exceptional facilities are offered for prospective teachers of commercial subjects by majoring in Commerce and minoring in Commercial Education to the extent of not less than 23 credits as outlined on page 197, or by majoring in the School of Vocational Education and minoring in Commerce to the extent of not less than 18 credits as indicated on page 38. A state certificate to teach in Oregon high schools is awarded upon the completion of not less than 23 credits in Education.

Facilities. The new Commerce Building, a handsome, commodious structure specially designed for executive offices and for departments related to administration and commerce, offers superior facilities for instruction and administration. The most approved methods of heating, lighting, ventilation, and sanitation are employed. The building is equipped with a variety of the most modern office appliances.

Departments. For administrative purposes, the School of Commerce is organized into four distinct departments: (1) Economics and Sociology, (2) Finance and Administration, (3) Political Science, (4) Secretarial Training.

Requirements for Graduation in the School of Commerce. For the bachelor's degree in the School of Commerce, a total of 207 college credits must be completed by men and 192 credits by women. It is expected that the suggested schedule as listed elsewhere for this School will be closely followed. Excepting those who major in Marketing of Agricultural Products (as outlined on page 200), students must complete before graduation credits as indicated in the following table:

SCHOOL OF COMMERCE

193

	Men	Women
Technical Subjects	36	36
Economics and Sociology	32	32
Political Science	28	28
English Composition	9	9
General English or Modern Language	9	9
Mathematics	9	9
Biologic or Physical Science	9	9
History	9	9
Library Practice	1	1
Physical Education	3	9
Military Science and Tactics	12	0
Hygiene	0	1
Principles of Dietetics	0	1
Social Ethics	0	1
Electives	50	38
Total	207	192

To major in any group (see pages 195-201) a minimum of 36 credits in the junior and senior years shall be directed by the respective advisers. Not less than 18 of the 36 credits must be in one department and the remaining credits in related work. The remaining 66 credits are elective, subject to above requirements for graduation.

For Science Combinations, see pages 203-204.

The requirements for the Junior Certificate in Commerce at the end of the sophomore year are as follows:

	Men	Women
Finance and Administration and Secretarial Training	30	30
English Composition	9	9
English or Modern Language	9	9
Economics and Sociology	12	12
Political Science	8	8
History, Mathematics, or Science	9	9
Library Practice	1	1
Physical Education	3	6
Hygiene	0	1
Social Ethics	0	1
Principles of Dietetics	0	1
Military Science and Tactics	12	0
Optional	12	12
Total	105	99

CURRICULA IN COMMERCE

(B.S. Degree)

Group 1

This group is arranged for those who intend to emphasize Accounting and related subjects from the start. Options, however, make it possible for students so desiring to defer certain of the technical work until after the sophomore year.

	Term		
	1st	2d	3d
¹ Principles of Accounting I, II, III (FA 101, 102, 103).....	3	3	3
² Introduction to Mathematical Theory of Interest (Mth 101a, 101b)	3	---	---
² Mathematics of Investment (Mth 102).....	---	3	---
² Introduction to Mathematics of Insurance (Mth 103).....	---	---	3
³ Typing I, II, III (ST 111, 112, 113).....	2	2	2
English Composition (Eng 101).....	3	---	---
Business Correspondence (Eng 105).....	---	3	---
Advanced Business English (Eng 106).....	---	---	3
⁴ Commercial Geography (ES 101).....	4	---	---
⁴ Economic History of Europe (ES 111).....	---	4	---
⁴ The History of Western Civilization II (Hst 212).....	---	---	3
Library Practice (Lib 100).....	---	---	1
Gymnastics and Calisthenics (PEM 111, 112, 113) (Men).....	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Gymnastics (PEW 111, 112, 113) (Women).....	(1)	(1)	(1)
Social Ethics (PEW 121), Hygiene (PEW 122) (Women).....	(1)	(1)	---
Principles of Dietetics (HS 200) (Women).....	---	---	(1)
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Sophomore Year

² Corporation Accounting I, II (FA 201, 202)	3	3	---
² Cost Accounting (FA 203).....	---	---	3
² Office Methods and Appliances I, II, III (ST 251, 252, 253) (Optional)	2	2	2
Advanced Business Law (PS 201, 202).....	4	4	---
Principles of Economics (ES 203).....	---	---	4
⁵ Economic History of United States (ES 201).....	3	---	---
⁴ The History of Western Civilization III (Hst 213)	---	3	---
⁵ Recent History of United States (Hst 126)	---	---	3
English Literature or Modern Language	3	---	---
American Literature or Modern Language	---	3	---
Public Speaking or Modern Language	---	---	3
Gymnastics and Calisthenics (PEM 211, 212, 213) (Men).....	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Gymnastics (PEW 211, 212, 213) (Women).....	(1)	(1)	(1)
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

¹Students who have had at least one year of bookkeeping may register for FA 102 the first term and FA 103 the second term.

²Students who intend to major in Advertising and Selling or in Markets and Marketing defer Mth 101a, 101b, 102, 103 until their sophomore year, and take FA 141, 142, 143.

³Optional with other subjects.

⁴Options in Home Economics: See page 202.

⁵Optional with Science in the sophomore year, but nine credits in History are required for graduation.

Group 2

This group is arranged for those who intend to emphasize Secretarial Training and related subjects from the start.

Freshman Year

	Term		
	1st	2d	3d
Stenography I, II, III (ST 101, 102, 103).....	3	3	3
Typing I, II, III (ST 111, 112, 113).....	2	2	2
¹ Principles of Accounting I, II, III (FA 101, 102, 103).....	3	3	3
English Composition (Eng 101).....	3	.....	.....
Business Correspondence (Eng 105).....	.....	3	.....
² Advanced Business English (Eng 106).....	.....	.....	3
² Economic History of Europe (ES 111).....	4	.....	.....
² The History of Western Civilization II (Hst 212).....	.....	3	.....
² Commercial Geography (ES 101).....	.....	.....	4
Library Practice (Lib 100).....	.....	1	.....
Gymnastics and Calisthenics (PEm 111, 112, 113) (Men).....	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Gymnastics (PEW 111, 112, 113) (Women).....	(1)	(1)	(1)
Social Ethics (PEW 121), Hygiene (PEW 122) (Women).....	(1)	(1)	.....
Principles of Dietetics (HS 200).....	.....	.....	(1)
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Sophomore Year

Applied Stenography and Typing I, II (ST 201, 202).....	5	5	.....
Office Training for Stenographers (ST 203).....	.....	.....	5
Advanced Business Law (PS 201, 202).....	4	4	.....
Principles of Economics (ES 203).....	.....	.....	4
³ Economic History of United States (ES 201).....	3	.....	.....
³ The History of Western Civilization III (Hst 213).....	.....	3	.....
³ Recent History of United States (Hst 126).....	.....	.....	3
English Literature or Modern Language.....	3	.....	.....
American Literature or Modern Language.....	.....	3	.....
Public Speaking or Modern Language.....	.....	.....	3
Gymnastics (Men).....	(1)	(1)	(1)
Gymnastics (Women).....	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Military Science and Tactics.....	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

ACCOUNTING AND MANAGEMENT

CHESTER F. LAY, Adviser

Freshman and Sophomore Years

Group 1, page 194

Junior Year

Advanced Accounting Theory and Practice (FA 401).....	3	.....	.....
Auditing (FA 402).....	.....	3	.....
Income Tax Procedure (FA 302).....	.....	.....	3
Business Organization (FA 331).....	3	.....	.....
Business Management (FA 332).....	.....	3	.....
Purchasing (FA 343).....	.....	.....	3
National Government (PS 301).....	3	.....	.....
State and Local Government (PS 302).....	.....	3	.....
Municipal Government (PS 303).....	.....	.....	3
Biologic or Physical Science.....	3	3	3
General electives or Military Science.....	5	5	5
	17	17	17

¹Students who have had at least one year of bookkeeping may register for FA 102 the first term, and FA 103 the second term.

²Options in Home Economics: See page 202.

³Optional with Science in the sophomore year, but nine credits in History are required for graduation.

Senior Year

	Term		
	1st	2d	3d
Governmental and Institutional Accounting (FA 303).....	3	---	---
Analysis of Accounts (FA 203).....	---	3	---
C. P. A. Problems (FA 403).....	---	---	3
Business Cycle (ES 411).....	3	---	---
Practical Banking (FA 333).....	---	4	---
Corporation Law (PS 413).....	---	---	4
Corporation Finance (FA 431).....	4	---	---
Public Finance (ES 401).....	4	---	---
Markets and Marketing (ES 402).....	---	4	---
Employment Management (ES 406).....	---	---	3
Comparative Governments (PS 402).....	---	3	---
International Relations (PS 401).....	---	---	4
General electives or Military Science.....	3	3	3
	17	17	17

ADVERTISING AND SELLING

H. T. VANCE, Adviser

Freshman and Sophomore Years*

Group 1, page 194

Junior Year

Commercial Art I, II (A 361, 362).....	3	3	---
Elementary Psychology (Psy 301).....	3	---	---
Practical Public Speaking I (PSP 254).....	---	3	---
Purchasing (FA 343).....	---	---	3
Business Organization (FA 331).....	3	---	---
Business Management (FA 332).....	---	3	---
General Sociology (ES 305).....	---	---	4
National Government (PS 301).....	3	---	---
Principles of Advertising (FA 441).....	---	3	---
Municipal Government (PS 303).....	---	---	3
Biologic or Physical Science.....	3	3	3
Electives.....	3	3	4
	18	18	17

Senior Year

Advanced Business English II (Eng 107).....	3	---	---
State and Local Government (PS 302).....	---	3	---
Psychology of Advertising and Selling (Psy 313).....	---	---	3
Elementary Industrial Journalism (IJ 200).....	3	---	---
Industrial Journalism (IJ 310).....	---	3	---
Writing Advertisements (IJ 323).....	---	---	3
Vocational Psychology (Psy 312).....	---	---	3
Marketing Manufactured Goods (ES 405).....	4	---	---
Markets and Marketing (ES 402).....	---	4	---
Business Cycle (ES 411).....	3	---	---
Comparative Governments (PS 402).....	---	3	---
Principles of Salesmanship (FA 443).....	---	---	3
Electives.....	3	3	5
	16	16	17

*Must include FA 141, 142, 143.

BANKING AND FINANCE

A. C. SCHMITT, Adviser

Freshman and Sophomore Years*

Group 1, page 194

Junior Year

	Term		
	1st	2d	3d
Business Organization (FA 331)	3	---	---
Business Management (FA 332)	---	3	---
Real Estate Practice (FA 405)	---	---	3
Money and Banking (ES 311)	4	---	---
National Government (PS 301)	3	---	---
State and Local Government (PS 302)	---	3	---
Municipal Government (PS 303)	---	---	3
Biologic or Physical Science	3	3	3
Practical Banking (FA 333)	---	4	---
Insurance (ES 303)	---	---	4
English or Electives	4	4	4
	17	17	17

Senior Year

Public Finance (ES 401)	4	---	---
Transportation (ES 403)	---	---	4
Comparative Governments (PS 402)	---	3	---
International Relations (PS 401)	---	---	4
The Business Cycle (ES 411)	3	---	---
Introduction to Foreign Trade (ES 306)	---	4	---
Corporation Finance (FA 431)	4	---	---
Investments (FA 432)	---	---	4
Risk Bearing (FA 433)	---	4	---
Seminar in Finance and Administration (FA 404, 405, 406)	1	1	1
English or Electives	5	5	4
	17	17	17

COMMERCIAL EDUCATION

J. A. BEXELL, Adviser

Freshman and Sophomore Years

This major is open to students who have completed any freshman and sophomore curriculum in Commerce or in Vocational Education with proper prerequisites.

Junior Year

	Term		
	1st	2d	3d
Elementary Psychology (Psy 301)	3	---	---
Measurement in Education (Ed 333)	---	---	3
Educational Psychology (Psy 322)	---	---	3
Principles of Teaching (Ed 311)	---	3	---
Business Organization (FA 331)	3	---	---
Purchasing (FA 343)	---	---	3
General Sociology (ES 305)	---	4	---
National Government (PS 301)	3	---	---
State and Local Government (PS 302)	---	3	---
Municipal Government (PS 303)	---	---	3
Biologic or Physical Science	3	3	3
Electives	5	3	2
	17	16	17

*Must include Credits and Collections (FA 143).

Senior Year

	Term		
	1st	2d	3d
Secondary Education in Commerce (CEd 451 or 452).....	3	---	---
Supervised Teaching in Commerce (CEd 461)	---	5	---
Organization and Administration of Commercial Education (CEd 470)	---	---	3
Money and Banking (ES 311).....	4	---	---
Markets and Marketing (ES 402), Transportation (ES 403).....	---	4	4
Comparative Governments (PS 402)	---	3	---
International Relations (PS 401)	---	---	4
American Literature I, II, III (Eng 431, 432, 433).....	3	3	3
Electives	7	3	3
	<u>17</u>	<u>18</u>	<u>17</u>

ECONOMICS AND SOCIOLOGY

W. H. DRESEN, Adviser

Freshman and Sophomore Years

Group 1, page 194

Junior Year

Money and Banking (ES 311)	4	---	---
General Sociology (ES 305)	---	4	---
Cooperation (ES 323)	---	---	4
Business Organization (FA 331)	3	---	---
Business Management (FA 332)	---	3	---
Purchasing (FA 343)	---	---	3
National Government (PS 301)	3	---	---
State and Local Government (PS 302)	---	3	---
Municipal Government (PS 303)	---	---	3
Biologic or Physical Science	3	3	3
General electives or Military Science	4	4	4
	<u>17</u>	<u>17</u>	<u>17</u>

Senior Year

Public Finance (ES 401)	4	---	---
Markets and Marketing (ES 402)	---	4	---
Transportation (ES 403)	---	---	4
Comparative Governments (PS 402)	---	3	---
International Relations (PS 401)	---	---	4
Governmental and Institutional Accounting	3	---	---
Analysis of Accounts (FA 203)	---	3	---
Modern Language, English or Public Speaking	3	3	3
Seminar	1	1	1
Electives in Economics and Sociology or Military Science	6	3	5
	<u>17</u>	<u>17</u>	<u>17</u>

SCHOOL OF COMMERCE

199

GENERAL BUSINESS

J. A. BEXELL, Adviser

Freshman and Sophomore Years

Group 1, page 194

Junior Year

	Term		
	1st	2d	3d
Business Organization (FA 331)	3	---	---
Business Management (FA 332)	---	3	---
Purchasing (FA 343)	---	---	3
Money and Banking (ES 311)	4	---	---
General Sociology (ES 305)	---	4	---
National Government (PS 301)	3	---	---
State and Local Government (PS 302)	---	3	---
Municipal Government (PS 303)	---	---	3
Biologic or Physical Science	3	3	3
Electives	4	4	8
	17	17	17

Senior Year

Public Finance (ES 401)	4	---	---
Markets and Marketing (ES 402)	---	4	---
Transportation (ES 403)	---	---	4
Comparative Governments (PS 402)	---	3	---
International Relations (PS 401)	---	---	4
Electives	13	10	9
	17	17	17

MARKETS AND MARKETING

H. MACPHERSON, Adviser

Freshman and Sophomore Years*

Group 1, page 194

Junior Year

Conservation (ES 211)	4	---	---
Markets and Marketing (ES 402)	---	4	---
Purchasing (FA 343)	---	---	3
Cooperation (ES 323)	---	---	4
Business Organization (FA 331)	3	---	---
Money and Banking (ES 311)	4	---	---
General Sociology (ES 305)	---	4	---
National Government (PS 301)	---	3	---
Municipal Government (PS 303)	---	---	3
Biologic or Physical Science	3	3	3
Electives	3	3	4
	17	17	17

Senior Year

Marketing Manufactured Goods (ES 405)	4	---	---
Introduction to Foreign Trade (ES 306)	---	4	---
Markets and Marketing (ES 603)	---	---	4
Principles of Advertising (FA 441)	---	3	---
Real Estate Practice (FA 405)	---	---	3
Transportation (ES 403)	---	---	4
State and Local Government (PS 302)	---	3	---
Practical Legislation (PS 412)	4	---	---
International Relations (PS 401)	---	---	4
Advanced American Government (PS 411)	4	---	---
Electives	5	6	3
	17	16	18

*Must include FA 141, 142, and 143.

MARKETING OF AGRICULTURAL PRODUCTS

N. H. COMISH, Adviser

Freshman and Sophomore Years

Major work in Marketing is open to students who have completed the freshman and sophomore years in Commerce. A similar course for students who have completed two years in Agriculture is outlined under the School of Agriculture.

Junior Year

	Term		
	1st	2d	3d
Rural Finance (ES 367)	3	.....	.....
Economic Organization of Agriculture (ES 364) .....	.....	3	.....
Rural Sociology (ES 464) .....	.....	.....	3
Business Organization (FA 331)	3	.....	.....
Auditing (FA 402) .....	.....	3	.....
Biologic or Physical Science	3	3	3
¹ Courses in Agriculture	5	5	5
Electives	3	3	6
	17	17	17

Senior Year

Public Finance (ES 401)	4	.....	.....
Markets and Marketing (ES 402, 603) .....	.....	4	4
Transportation (ES 403) .....	.....	.....	4
National Government (PS 301)	3	.....	.....
State and Local Government (PS 302) .....	.....	3	.....
Municipal Government (PS 303) .....	.....	.....	3
Principles of Advertising (FA 441) .....	.....	3	.....
¹ Courses in Agriculture	3	3	3
Electives	7	4	3
	17	17	17

POLITICAL SCIENCE

U. G. DUBACH, Adviser

Freshman and Sophomore Years

Group 1, page 194

Junior Year

The English Essay (Eng 211)	3	.....	.....
Advanced English Composition (Eng 201) .....	.....	3	.....
English Literature III (Eng 323) .....	.....	.....	3
International Relations (PS 401)	4	.....	.....
Comparative Government (PS 402, 403) .....	.....	3	3
Business Organization (FA 331)	3	.....	.....
Money and Banking (ES 311) .....	.....	4	.....
Insurance (ES 303) .....	.....	.....	4
Biologic or Physical Science	3	3	3
Electives	4	4	4
	17	17	17

¹Courses in Agriculture must be selected, upon the approval of the major professor, in some one department in Agriculture.

Senior Year

	Term		
	1st	2d	3d
American Literature I, II, III (Eng 431, 432, 433).....	3	3	3
Advanced American Government (PS 411)	4	.....	.....
Practical Legislation (PS 412) .....	.....	4	.....
Corporation Law (PS 413) .....	.....	.....	4
Public Finance (ES 401)	4	.....	.....
Transportation (ES 403) .....	.....	.....	4
Seminar in Political Science (PS 404, 405, 406)	1	1	1
Investments (FA 432) .....	.....	4	.....
Electives	5	5	5
	17	17	17

SECRETARIAL TRAINING

MABEL MAGINNIS, Adviser

Freshman and Sophomore Years

Group 2, page 195

Junior Year

Secretarial Studies (ST 411)	5	.....	.....
Secretarial Practice (ST 412) .....	.....	.....	2
Business Organization (FA 331)	3	.....	.....
Business Management (FA 332) .....	.....	3	.....
Purchasing (FA 343) .....	.....	.....	3
General Sociology (ES 305) .....	.....	4	.....
National Government (PS 301)	3	.....	.....
State and Local Government (PS 302) .....	.....	3	.....
Municipal Government (PS 303) .....	.....	.....	3
Biologic or Political Science	3	3	3
General electives or Military Science	3	4	6
	17	17	17

Senior Year

Reporters' Course I, II, III (ST 401, 402, 403).....	3	3	3
Elementary Industrial Journalism (IJ 200)	3	.....	.....
Money and Banking (ES 311)	4	.....	.....
Markets and Marketing (ES 402) .....	.....	4	.....
Labor Problems (ES 301) .....	.....	4	.....
Comparative Governments (PS 402) .....	.....	3	.....
International Relations (PS 401) .....	.....	.....	4
General electives or Military Science	7	3	10
	17	17	17

SUGGESTED COMBINATIONS FOR MINORS

The several curricula outlined on pages 194-201 provide for a number of electives. While the student may choose other subjects than those enumerated below, he is strongly urged to adopt one of the suggested combinations. A minor shall include not less than 18 credits in the group selected. Men are urged to elect Military Science and Tactics. The nine required credits in Biologic or Physical Science must be completed in the junior year.

1. MINOR IN AGRICULTURE

Junior Year

	Term		
	1st	2d	3d
Electives in Physical Education or Military Science and Tactics	4	4	8

	Senior Year		
	1st	2d	3d
Stock Judging I (AH 111)	3	---	---
Farm Management (FMg 302)	---	4	---
Soil Drainage and Irrigation (Sls 203)	---	---	3
Electives in Agriculture	10	6	6

2. MINOR IN HOME ECONOMICS

Junior Year			
¹ Clothing and Textiles (HA 108, 109, 110)	4	4	4
Introduction to Home Economics (HAd 100)	1	---	---
Millinery (HA 328)	---	2	---
Child Care (HAD 325)	---	---	3

Senior Year			
Food Preparation (HS 203, 204, 205)	4	4	4
Home Nursing (HAD 435)	3	---	---
Textile Design and Color (HA 428)	3	---	---
Home Planning and Furnishing (HA 438)	3	---	---
Household Management (HAD 445)	---	3	---
Home Management House (HAD 450)	---	---	4

3. MINOR IN ENGINEERING

Junior Year			
Plane Trigonometry (Mth 111)	4	---	---
Algebra (Mth 121)	---	4	---
Differential Calculus (Mth 251)	---	---	4
Engineering Problems (ME 101)	---	2	---
Carpentry (IA 222)	---	---	3

Senior Year			
² Linear Drawing and Lettering (ME 111)	2	---	---
² Gas or Steam Engines (ME 222 or 223)	---	3	---
Automobile Mechanics (IA 181)	---	---	2
Electives in Engineering	8	7	7

4. MINOR IN PHYSICAL EDUCATION (Women)*

Junior Year			
Advanced Gymnastics (PEw 311, 312, 313)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Dancing (PEw 331, 332, 333)	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
Theory of Play (PEw 271)	3	---	---
Playground and Gymnastic Games (PEw 275)	---	3	---
Theory of the Coaching of Athletics (PEw 376)	---	---	3
Elective	---	---	4

¹Students who have taken these subjects as options in the freshman and sophomore years will select advanced courses, subject to approval of the head of the department. Other courses in Home Economics offered for students in Commerce are: HS 201; HA 118, 218, 328, 428, 438; HAd 210, 445; HS 200 required in General Business and Secretarial Training.

²Optional with selected subjects in other Engineering departments, subject to approval of the head of the department.

*In the case of students minoring in Physical Education the required Science work (9 credits) in their general curriculum should be taken in Zoology and Physiology.

	Term		
	1st	2d	3d
Advanced Athletics (PEw 241, 242, 243)	3	3	3
Intermediate Swimming (PEw 251, 252, 253)	3	3	2
Advanced Hygiene and Sanitary Science (PEw 423)	3	---	---
History of Physical Education (PEw 261)	3	---	---
Principles and Methods of Physical Education (PEw 361, 362, 363)	3	3	3
Practice Teaching (PEw 464, 465, 466)	1	1	1
Organization and Administration of Physical Education and Recreation (PEw 272)	---	3	---
Massage (PEw 441)	3	---	---
Therapeutic Gymnastics (PEw 443)	---	---	3
Physical Diagnosis and Anthropometry (PEw 442)	---	3	---

5. MINOR IN PHYSICAL EDUCATION (Men)*

Junior Year

Electives in Physical Education or Military Science and Tactics	4	4	8
---	---	---	---

Senior Year

Electives in Physical Education or Military Science and Tactics..	13	10	9
---	----	----	---

6. MINOR IN INDUSTRIAL JOURNALISM

Junior Year

Elementary Industrial Journalism (IJ 200)	3	---	---
Industrial Journalism (IJ 310)	---	3	---
Technical Journalism (IJ 330)	---	---	3
Electives in English, Industrial Journalism, and Military Science and Tactics	1	1	5

Senior Year

Editing (IJ 320)	3	---	---
Journalism Practice I (IJ 204)	---	2	---
Technical Journalism (IJ 330)	---	---	3
Electives in English, Industrial Journalism, and Military Science and Tactics	10	8	6

7. MINOR IN BASIC ARTS AND SCIENCES

A student may select not less than 18 credits from any of the departments in the School of Basic Arts and Sciences as his minor. Before registering, consult the Dean and the head of the department concerned.

SCIENCE COMBINATIONS FOR COMMERCE STUDENTS

Nine credits in Biologic or Physical Science must be completed by the end of the junior year. Not less than six of these credits must be taken in basic sciences requiring laboratory work.

*In the case of students minoring in Physical Education the required Science work (9 credits) in their general curriculum should be taken in Zoology and Physiology.

BACTERIOLOGY

	Term		
	1st	2d	3d
General Bacteriology (Bac 200) .....	.....	.....	3
and any one of the following:			
Physics (Ph 101, 102)	3	3	....
Zoology (ZP 101, 102)	3	3	....
Geology (G 301a, 302a)	3	3	....

BOTANY

The Seed Plants (Bot 201), The Plant Kingdom (Bot 202), Plant Identification (Bot 203)	3	3	3
---	---	---	---

CHEMISTRY

General Chemistry (Ch 101, 102, 103)	3	3	3
--	---	---	---

GEOLOGY

General Geology (G 301a), Historical Geology (G 302a)	3	3	....
Economic Geology (G 433a) .....	.....	.....	3

PHYSICS

General Physics (Ph 101, 102)	3	3	....
Descriptive Astronomy (Ph 243) .....	.....	.....	3

ZOOLOGY AND PHYSIOLOGY

General Zoology (ZP 101, 102, 103)	3	3	3
General Zoology (ZP 101, 102)	3	3	....
Genetics (ZP 351)	3	....	....
General Zoology (ZP 101, 102)	3	3	....
Evolution and Eugenics (ZP 353) .....	.....	.....	3

COMMERCIAL EDUCATION

The department of Commercial Education has been organized to meet the steadily growing demand for well-equipped teachers of commercial branches in secondary schools. Such teachers are prepared by the School of Vocational Education in cooperation with the School of Commerce. The curriculum in the School of Commerce leading to the degree of Bachelor of Science makes possible satisfactory preparation for commercial teaching. In the selection of their collegiate courses in both Commerce and Education, students should advise with the head of the department of Commercial Education. This department provides an equipment for teachers of commercial science in secondary schools that will place them and their work on a parity with those of other longer established and more fully developed departments of the high school.

For the courses in Commercial Education see School of Vocational Education.

ECONOMICS AND SOCIOLOGY

Including Rural Markets and Rural Organization

The work of this department serves the following purposes:

(1) To train both men and women for citizenship. Every citizen has business relations requiring a knowledge of the fundamental principles of economics. The necessity of such knowledge

is especially felt in a democracy where every man and woman has the right to vote and is called upon to mold legislation directly. The basis for intelligently exercising this paramount duty of citizenship can only be supplied by a training in economics and sociology, the problems of which form the subject-matter of most legislation.

(2) **To provide economics training for technical students.** Three credits in economics are required of all students in the College. In consultation with the deans of the various schools, required and elective courses have been worked out supplementary to the work of each school.

(3) **To train specialists in Agricultural Economics and Rural Sociology.** The School of Agriculture provides that students may elect a minor in Agricultural Economics and Rural Sociology. Such a minor affords excellent preparation for those who intend to go back to the farm and assume positions of business, educational, and political leadership. It gives the training needed for positions in state and Federal bureaus of markets. It lays a foundation for a business career as commission man, broker, jobber, wholesaler, or exporter of farm products. It should give the best possible training for positions as county agents, where capacity for leadership outweighs all other considerations.

(4) **To do field work. The Bureau of Organization and Markets.** In 1914 the Board of Regents established the Bureau of Organization and Markets for the purpose of assisting farmers in marketing their products. The Bureau has been carrying on its work in cooperation with the Bureau of Markets of the United States Department of Agriculture.

The work of the Bureau, in the first place, is investigational. It aims to find out the conditions fundamental to successful marketing, and to place the results of its investigation at the disposal of all who are interested. In the second place, it is at the service of any group of farmers contemplating the establishment of any sort of business organization. It has worked out model constitutions and by-laws and standardized systems of accounting; it has lists of equipment and, in cooperation with the various technical departments of the College, can inform farmers where such equipment can be most cheaply obtained. It also assists organizations in planning the kind of plants necessary to carry on their business.

Equipment. The department has for some years been developing a commercial museum for use in the various courses in economic and social science. The museum has now grown to such an extent that it is a very important factor in making the work of the department practical and successful. The Bureau of Organiza-

tion and Markets also has a collection of bulletins, pamphlets, lantern slides, and documents illustrating the farmers' marketing and organization movement in all parts of the world.

COURSES

NOTE: The courses in Economics and Sociology are arranged in numerical order within the following groups: General Economics, General Sociology, Rural Economics and Sociology, Marketing.

GENERAL ECONOMICS

ES 101. Commercial Geography. The physiographic basis of commerce and industry; the natural resources of the different countries of the world; the geographic distribution of labor and industry as determined by natural conditions such as climate, topography, soil, and mineral resources. Specimens from the Commercial Museum are used by the students. Assigned readings, outline maps. (Juniors and seniors wishing to take Economic Geography, see ES 408.)

Required in Commerce and Industrial Arts; freshman year; any term; 4 credits; 4 recitations. *M. Jane Gain*

ES 111. Economic History of Europe. A course covering the most important economic changes and developments in modern Europe; study of manorial system, handicraft system, domestic and factory systems; important changes in agriculture; rise of factory system; trades unionism; the development of commercial policies; labor organizations, together with socialism and social insurance.

Required in Commerce; freshman year; any term; 4 credits; 4 recitations. *E. B. Mittelman, V. P. Morris*

ES 201. Economic History of the United States. On the basis of a knowledge of our natural resources and of the previous commercial and economic development of the world, attempt is made to outline and interpret the economic and social progress of the United States. The development of agriculture, the growth of manufacturing, the improvement of transportation, the history of labor organization and legislation, the evolution of our monetary and credit systems, changes in the protective tariff, progress towards economic and social solidarity, etc., are traced from Colonial times onward.

Prerequisites: ES 101, 111. Required in Commerce; sophomore year; first term; 3 credits; 3 recitations. *H. Macpherson*

ES 203. Principles of Economics. A general course covering our industrial and commercial organization, the nature of wealth, its production, consumption, and distribution; law of diminishing

returns; division of labor and efficiency in production; exchange and distribution in their relation to the price-making process; factors determining prices, wages, interest, rent, and profits; problems of taxation; public expenditures; protection and free trade; money and banking; labor problems; and transportation. Text-book, lectures and reports on assigned readings.

Prerequisites: ES 101, 201. Required in Commerce; sophomore year; second or third term; 4 credits; 4 recitations.

W. H. Dreesen, V. P. Morris

ES 211. Conservation. Economic wastes arising out of the exploitation of natural resources; the maladjustment of industry; the misdirection of labor; the present order of consumption; conservation laws and policies tending to eliminate wastes and abuses.

Elective to any student who has had ES 203, 391, or 362, or equivalent; first term; 4 credits; 4 recitations.

N. H. Comish

ES 301. Labor Problems. Undertakes a summary study of the workers' income; factors determining that income in whole and in parts; industrial hazards and methods of meeting them; trade union solutions of the wages, hours, and conditions problems; social effects and reactions.

Prerequisite: ES 203 or ES 391. Elective in Commerce; junior or senior year; second or third term; 4 credits; 4 recitations.

E. B. Mittelman

ES 303. Insurance. A course designed to cover, in a general way, the whole field of insurance. Nature and statistical basis of different kinds of insurance; application of the principles discovered to different forms of insurance such as straight life, endowment, accident, industrial, old age, fire, livestock, hail, etc., taken up in detail.

Elective; junior or senior year; third term; 4 credits; 4 recitations.

W. H. Dreesen

ES 311. Money and Banking. (a) Money. The nature and functions of money; the factors affecting price, and their relation to business conditions; brief history of the various forms of money; present problems and conditions. (b) Banking. Functions of banks; history of banking, including our national banking system, with emphasis upon the Federal Reserve Bank Act; comparison of our banking system with those of foreign countries. Assigned readings. Two sections first term; one section second term.

Prerequisite: ES 203. Required in Commerce; junior year; first or second term; 4 credits; 4 recitations.

W. H. Dreesen

ES 391. Introduction to Economics. Abbreviated course (see ES 203).

Required except in Commerce and Agriculture; any term; 3 credits; 3 recitations. *N. H. Comish, V. P. Morris*

ES 401. Public Finance. Public expenditures, local, state, and national; brief history of reforms calculated to secure efficiency in these expenditures; forms of taxes, customs, and fees whereby revenues are raised; present systems of land taxation studied in the light of proposed reforms; special attention to war finance; bonds versus taxes in public finance; management of national and local debts. Assigned readings.

Required in Commerce; senior year; first term; 4 credits; 4 recitations. *W. H. Dreesen*

ES 403. Transportation. Relation of transportation systems to industrial and commercial progress; a brief historical review of the development of systems of transportation; organization and financing of different systems; effect of competition in the railroad business; freight classification and the making of rates and fares; the necessity of government control and attempts at regulation by state and Federal governments; government ownership in the light of European experience.

Required in Commerce; senior year; third term; 4 credits; 4 recitations. *E. B. Mittelman*

ES 404, 405, 406. Seminar in Economics and Sociology. This course is given in the form of current economic or sociological topics led by the various instructors in the department.

Elective to juniors or seniors who have completed at least 18 credits in Economics and Sociology; three terms; credit depending on amount of work done; 1 period.

ES 407. Employment Management. This course aims to introduce the student to the labor problem as found in the shop, mill, or factory, in contradistinction to the labor problem as found in the hopes, aims, and activities of the laborer and his organization. In detail, problems of job analysis and scientific management, psychological tests, systematic placing and promoting, labor's participation in management, the public's concern in such participation will be covered. Recommended for seniors in Commerce and Forestry and juniors and seniors in Engineering who expect to employ and manage men.

Required in Accounting and Management; junior or senior year; third term; 3 credits; 3 recitations. *E. B. Mittelman*

ES 411. Business Cycle. This course undertakes a discussion of the theories of the business cycle; that is, the theories of alternate prosperity and depression; reviews the various practices in the making of index numbers; applies the index numbers to the

incidents of the business cycle in the way of forecasting future developments in business.

Prerequisite: Mth 103. Required in Advertising and Selling; elective to others; senior or graduate year; first term; 3 credits; 3 recitations. *E. B. Mittelman*

GENERAL SOCIOLOGY

ES 305. **General Sociology.** Origin, development, present conditions, and social functioning of our social units, such as the family, the school, the church, clubs, associations, institutes, etc.; the city, state, and nation; interpretation of the causes of the strength and weakness of modern social institutions, showing their influence upon the general welfare of society and the progress toward greater efficiency; analysis of the social causes and effects of ignorance, vice and crime, poverty, unstable family relations; general discussion of the principles underlying their elimination.

Elective; junior year; any term; 4 credits; 4 recitations.

H. Macpherson, J. F. Page

ES 307. **Educational Sociology.** A study of the field of sociology from the educational point of view; social institutions in their origin and development; social activities in their relation to institutions and the individual; social control or the molding of social institutions and the directing of social activities; different methods of social investigation and their comparative results. May be substituted for Introduction to Sociology (ES 393).

Elective; junior year; second term; 3 credits. *H. Macpherson*

ES 365. **National Vitality.** The general field of national vitality; its importance; the conditions underlying it, and the means of maintaining such conditions. This course will not be given unless at least fifteen students register for it.

Elective; junior or senior year; third term; 2 credits; 2 recitations. *H. Macpherson*

ES 393. **Introduction to Sociology.** Abbreviated course (see ES 305).

Required in Home Economics and in Vocational Education; elective for all students except Commerce; any term; 3 credits; 3 recitations. *H. Macpherson, J. F. Page, M. Jane Gain*

ES 413. **Applied Sociology.** Application of the principles of sociology to the promotion of social welfare; ethical gains through legislation and through voluntary associated and individual effort for the control of housing, relief of poverty, the suppression of vice, the control of juvenile delinquents, prison reforms, cooperation among religious institutions, elimination of corruption from

politics, care and elimination of mental and physical defectives; lectures, supplementary readings, and problem investigation.

Open to students who have had either ES 305 or ES 393. Elective; junior or senior year; third term; 3 credits; 3 recitations.

H. Macpherson

ES 415. **The Family.** A survey of the evolution of matrimonial institutions; the modern legal status of marriage; economic and social aspects of the modern family; women in industry and the new woman's movement in relation to the family; a comparative study of the divorce problem.

Elective; senior year; second term; 3 credits. *H. Macpherson*

RURAL ECONOMICS AND SOCIOLOGY

ES 362. **Agricultural Economics.** Fundamental principles of production, consumption, and distribution with special reference to agriculture; land tenure; land values; the law of proportions; price-making processes; money; banking; rural credit; cooperation; marketing; transportation; taxation; rent; interest; wages; and profits.

Required in Agriculture; junior year; first or third term; 3 credits; 3 recitations.

N. H. Comish

ES 364. **The Economic Organization of Agriculture.** The economic organization of farmers for more efficient production, purchasing, and marketing. A discussion of such organizations as the Grange, the Farmers' Union, the American Society of Equity, the Gleaners, and the Farm Bureau.

Open to all students who have had ES 362 or its equivalent. Elective; junior or senior year; second term; 3 credits; 3 recitations.

N. H. Comish

ES 366. **The Literature and Exposition of Rural Life.** A critical study of the general field of literature bearing upon rural life; typical interpretations of rural life from the best poetry and prose; the rural press studied with a view to estimating its sociological and economic influence; themes upon current economic and sociological topics and the subject-matter discussed in the classroom to familiarize the student with the problems involved in the rural life movement.

Elective; junior, senior, or graduate year; second term; 4 credits; 4 recitations.

H. Macpherson

ES 367. **Rural Finance.** Various phases of farm finance, including, among other topics, the following: principles of money, banking, and credit; rural credit laws; registration of land titles; rental and transfer contracts; land settlement and colonization policies; types of rural insurance; and the taxation of rural properties.

Open to those who have had ES 362 or equivalent. Elective; junior or senior year; first term; 3 credits; 3 recitations.

N. H. Comish

ES 464. **Rural Sociology.** Special problems of the evolution of rural institutions, the rural community, the rural family, the rural school, the rural church, rural societies and associations; rural systems of transportation and communication; the dependence of national welfare upon the rural community.

Elective; junior or senior year; third term; 3 credits; 3 recitations.

H. Macpherson

ES 605. **The Principles and Methods of the Rural Survey.** The principles of the scientific method and their statistical application to rural economic and sociological research; the purposes, forms, and preparation of schedules; editing, tabulation, and interpretation of data; principles of graphic presentation; study of a wide range of typical social and economic surveys, showing varieties of form and method adapted to different purposes. A seminar course for graduate students in Economics and Rural Sociology, to which seniors may be admitted by permission of the instructors.

Prerequisites: ES 203 or ES 391 or ES 362, and ES 305 or ES 393. Elective; senior or graduate year; third term; 5 credits; 2 meetings.

MARKETING

ES 304. **Ocean Transportation.** An advanced course in the study of ocean trade routes, ship canals, ports, and terminals, ocean transportation service and marine insurance. For students planning to enter foreign trade.

Elective to students who have had ES 101 and ES 203; first term; 3 credits; 3 recitation and lecture periods.

W. H. Dreesen

ES 306. **Introduction to Foreign Trade.** International values; international commercial policies and treaties; bases of foreign trade; consular service; foreign exchange and international banking systems; ocean routes and carriers; methods of packing and shipping; shipping documents; marine insurance; foreign trade organizations.

Elective to students who have had ES 101 and ES 203; second term; 4 credits; 4 recitation and lecture periods.

W. H. Dreesen

ES 323. **Cooperation.** Origins, structures, objects, methods, and results of cooperative producers', consumers', and marketing associations, including, for example, such cooperative organizations as creameries, cheese factories, meat factories, stores, purchasing societies, consumers' leagues, warehouses, grain elevators, fruit and vegetable associations, livestock societies, credit and insurance companies.

Elective to juniors and seniors who can not take ES 364 and ES 367, and who have had ES 203, 391, or 362, or equivalent; third term; 4 credits; 4 recitations.

N. H. Comish

ES 402. Markets and Marketing. A critical study of the marketing of staples, semi-staples, and perishable farm products, including the geographical location of producing areas, marketing routes from the producer to the consumer, types of middlemen, direct marketing, marketing costs, standardization, factors influencing prices, and a general description of our whole marketing system as it exists today.

Required in Commerce; elective to other students by permission of instructor; senior year; second term; 4 credits; 4 recitations.

N. H. Comish

ES 405. Marketing Manufactured Goods. A course that treats marketing from the standpoint of the manufacturer. Merchandising channels, sales organizations, sales management, and the economics of advertising are critically considered.

Required in Markets and Marketing; senior or graduate year; first term; 4 credits; 4 lectures and recitations.

N. H. Comish

ES 408. Economic Geography. An advanced course for students who are majoring in Markets and Marketing and foreign trade.

Elective in Commerce; junior or senior year; second or third term; 3 credits; 3 recitations.

M. Jane Gain

ES 603. Markets and Marketing. Continuation of ES 402. An intensive study of the products entering domestic and foreign trade and the methods of marketing them. Among other topics taken up are the following: development of marketing systems; speculation, organized and unorganized; local, state, and national commercial programs and policies; commercial clubs, boards of trade, chambers of commerce; foreign trade relations; transportation routes; the consular service; commercial treaties; tariffs; bounties; and foreign exchange.

Elective to graduate and senior students upon consultation with the instructor; third term; 4 credits; 4 recitations.

N. H. Comish

FINANCE AND ADMINISTRATION

The distinctive work of the department of Finance and Administration is to train men and women for efficiency in business and administration. The courses provide for thorough training in the various phases of accounting, auditing, banking and finance, busi-

ness organization, scientific management, salesmanship, and advertising.

The School of Commerce has also taken a leading part in developing courses in business methods, especially adapted to the farm and other industrial enterprises, the home, and cooperative institutions.

When it is remembered that every vocation has its business side, and that this phase of all pursuits is receiving increasing attention, it is apparent that the avenues of employment and the chances for promotion for the really competent business expert are almost unlimited. The man or woman with such training in organization and business management is increasingly in demand. As a preparation for a financial career, for law, or public accounting, the work of this department, combined with economics and political science, is especially attractive. A large portion of the graduates in Commerce find employment as teachers of commercial subjects in state and private schools. To them the courses in finance and administration are very important.

Advisory Committee on Banking. The department of Finance and Administration offers special facilities to students who are preparing for a career in Banking or Finance. In order that the courses in Banking and Finance shall always respond to the needs of those engaged in financial pursuits, as well as of those contemplating a financial career, the following advisory committee, composed of active bankers, has consented to advise with the College from time to time as to how the courses in Finance and Banking may be further strengthened:

- C. C. Colt, vice-president, First National Bank, Portland
- S. L. Eddy, vice-president, Ladd and Tilton Bank, Portland
- E. C. Sammons, vice-president, U. S. National Bank, Portland
- C. H. Stewart, vice-president, Northwestern National Bank, Portland
- F. E. Callister, vice-president, First National Bank, Albany
- C. D. Rorer, president, Bank of Commerce, Eugene
- J. W. McCoy, cashier, First National Bank, Ashland

The College is included in the Linn and Benton Chapter of the American Institute of Banking. Any student in Banking and Finance at the College may become an active member, and on passing a satisfactory examination in the subjects prescribed by the Institute, is entitled to an A. I. B. Certificate.

Advisory Committee on Accounting and Management. No other business activity has made greater progress in late years than that of professional accountancy. Nearly every state in the

Union now has a law providing for the certification of public accountants and Oregon adopted such a law in 1913. That the Commerce Staff may keep in close touch with actual business conditions and the requirements of the accountancy profession, an Advisory Committee of prominent practicing accountants has been organized, as follows:

A. Lester Andrus, C.P.A.
E. E. Bosworth, C.P.A.
Max Crandall, C.P.A.
Alex C. Rae, C.P.A.
Seth Roberts, C.P.A.
Wm. Whitfield, C.P.A.

Requirements for the C. P. A. Certificate in Oregon. An act of Oregon imposes the following requirements: Applicants must be citizens of the United States or must have declared their intention to become such citizens. They must be at least twenty-one years of age, must have good moral character, must have a high school education or the equivalent thereof, must have had one year of public accounting experience (either before or after examination), and must pass a satisfactory examination in Accounting Theory and Practice, Auditing and Commercial Law. Examinations are held twice a year, in May and November. Thirty-six other states give a uniform examination at the same time. The fee for the examination is \$25. The State Board of Accountancy, Portland, Oregon, will furnish blanks upon application. For unauthorized use of the C. P. A. title the law imposes a penalty of not more than \$200 or imprisonment in the county jail for a term not exceeding six months.

Equipment. The department of Finance and Administration is completely equipped for thorough and efficient work in modern business courses. Each room is especially designed and furnished for the work conducted in it. The furniture of the department consists of individual desks and counters and complete sets of office fixtures. Permanent blank books, letter files, rubber stamps, blanks, and similar material are provided by the department. Modern accounting and office machinery of various types, including adding machines, posting machines, a bookkeeping typewriter, calculating machines, duplicators, mimeographs, dictaphones, mimeoscope, filing cabinets, and typewriters, is available for student practice.

COURSES

NOTE: *The courses in Finance and Administration are arranged in numerical order within the following groups: Accounting, Advertising and Selling, Banking and Finance, Organisation and Management.*

ACCOUNTING

FA 101. Principles of Accounting I. A thorough but rapid study of the general principles of bookkeeping. The aim of this course is to afford those students who have not had a year of bookkeeping, an opportunity to secure preparation which will enable them to carry course FA 102.

Required in Commerce (freshman year) and in Horticultural Products (sophomore year); any term; 3 credits; 3 recitations. Fee \$1.00. *L. C. Ball, J. H. Irvine*

FA 102. Principles of Accounting II. Modern accounting as practiced in the best business establishments; the use of special columns; controlling accounts, and their adaptations; labor-saving devices of all kinds studied with a constant view to secure greater accuracy and to diminish work; practice in retail, wholesale, and financial statements.

Prerequisite: FA 101 or equivalent. Required in Commerce (freshman year) and Horticultural Products (sophomore year); any term; 3 credits; 3 recitations. Fee \$1.00.

L. C. Ball, J. H. Irvine

FA 103. Principles of Accounting III. A continuation of FA 102. A further study of special columns; partnership profits; admission of new partner; depreciation, reserves, and good-will; opening and closing corporation books.

Prerequisite: FA 102. Required in Commerce (freshman year) and Horticultural Products (sophomore year); any term; 3 credits; 2 lectures; 1 recitation. Fee \$1.00. *L. C. Ball, J. H. Irvine*

FA 201. Corporation Accounting I. Theory of corporation accounting and the preparation of accounts illustrating the principles involved. Considerations of depreciation, surplus, reserves, and dividends, advanced forms of financial statements. Throughout the course, theory is supplemented by problems and practice to develop initiative and originality.

Prerequisite: FA 103. Required in Commerce; sophomore year; first or third term; 3 credits; 2 lectures; 1 recitation. Fee \$1.00. *F. L. Robinson*

FA 202. Corporation Accounting II. A continuation of FA 201. A study of the theory and practice of accounting adapted to a large wholesale and manufacturing corporation using the voucher system.

Prerequisite: FA 201. Required in Commerce; sophomore year; second term; 3 credits; 3 recitations. Fee \$1.00.

F. L. Robinson

FA 203. Cost Accounting. This course covers the broader economic phases of accounting. Emphasis is laid on accounts as a means of administrative control and economy of production. (a) Theory of Cost Accounting. The elements of costs; cost and stock records; relation of cost accounts to the financial records; distribution of overhead; cost statements; graphical representation of costs. (b) Factory Costs. A laboratory course especially adapted to a manufacturing business with a considerable pay-roll.

Prerequisite: FA 202. Required in Commerce; sophomore year; third term; 3 credits; 3 recitations. Fee \$1.00.

F. L. Robinson

FA 301. Advanced Accounting Theory and Practice. Advanced forms of financial statement; the comparative balance sheet and profit and loss statement; statement of affairs and deficiency accounts; realization and liquidation; consolidated balance sheet; supplemented with practical problems.

Prerequisite: FA 203. Elective in Commerce; junior year; first term; 3 credits; 2 lectures; 1 recitation. Fee \$1.00. *C. F. Lay*

FA 302. Auditing. The duties and responsibilities of the auditor; his function in the executive staff; his relation to the accounting department; different classes of audits; investigation in the conduct of manufacturing, trading, and the utility corporations, municipalities, and public institutions. Typical audits will be studied and compared. Selected exercises.

Prerequisite: FA 401. Elective in Commerce; sophomore year; second term; 3 credits; 3 recitations. *C. F. Lay*

FA 303. Income Tax Procedure. A thorough study of income, excess profits, and other Federal taxes as they affect business, with particular reference to the accounting department. The aim is to train the student to determine these taxes correctly and to prepare the required returns and reports. The preparation of regular return forms is required in connection with the solution of practical problems.

Prerequisite: FA 203. Elective in Commerce; junior year; third term; 3 credits; 3 recitations. *W. R. Robertson*

FA 361. Farm Accounting. While this course is a thorough discussion of systems of accounts suited to the farm, the fundamental principles of accounting are not ignored. Cost accounting is especially emphasized, with a view to determining the results of different enterprises. A thorough study is made of the income tax law as related to farm accounting.

Required in Agriculture; junior year; first or second term; 3 credits; 1 lecture; 2 recitations. *F. L. Robinson*

FA 385. **Principles of Accounting for Engineers.** An abbreviated course covering the general principles of accounting, designed especially for Engineering students. Emphasis is placed on accounting principles, rather than technique. The ultimate aim is to prepare the student to read and interpret accounting facts, rather than to construct accounts.

Required in Civil and Mechanical Engineering (second term) and in Forestry and Logging Engineering (third term); junior year; 3 credits; 3 lectures. Fee \$1.00. *F. L. Robinson*

FA 401. **Governmental and Institutional Accounting.** Financial and property accounting, especially as applied to the municipal, state, and national governments and institutions; estimates, appropriations, apportionments, allotments, methods of handling pay; purchase of supplies and equipment; property accounting and accountability; how supplies and property are obtained, issued, and accounted for in the various organizations; the preparation of budgets and reports.

Prerequisite: FA 201 or equivalent. Elective; senior year; first term; 3 credits; 1 lecture; 2 recitations. *C. F. Lay*

FA 402. **Analysis of Accounts.** Preparation, analysis and interpretation of financial and operating reports by the application of ratios and turnovers.

Prerequisite: FA 202. Required in Commerce; senior year; third term; 3 credits; 3 recitations. Fee \$1.00.

FA 403. **C. P. A. Problems.** This course covers a large variety of practical problems viewed from the standpoint of the manager rather than the accountant. The material is drawn from certified public accountability examinations and other sources. The student does not follow any prescribed form of treatment or solution, but is expected to develop analytical initiative, resourcefulness, and originality.

Prerequisite: FA 303. Elective in Commerce; senior year; third term; 3 credits; 3 recitations. *C. F. Lay*

ADVERTISING AND SELLING

FA 141. **Retail Selling.** A general course covering the leading principles of retail salesmanship, and the development and expansion of the different aspects of the vocation, such as systems, policies, and conditions in retail stores.

NOTE: FA 361, 363, 371, and 381, are not open to students in Commerce.

Required in Markets and Salesmanship (freshman year) and in Pharmacy (junior year); first term; 3 credits; 3 lectures.

H. T. Vance

FA 142. Retail Advertising. A general introductory course in advertising, covering a study of the possible fields of advertising, materials of advertising mediums, a study of advertising campaigns, and a justification of advertising as a fixed expense.

Required in Markets and Salesmanship; freshman year; second term; 3 credits; 3 lectures.

H. T. Vance

FA 343. Purchasing. Principles of purchasing; relations of buying to successful merchandising and manufacturing; ethics of buying; the purchasing organization; records of purchasing; stores, their function and operation; selected problems in purchasing.

Required in Commerce; elective to others; junior year; third term; 3 credits; 2 lectures; 1 recitation.

H. T. Vance

FA 405. Real Estate Practice. The real estate business organization, advertising and selling real estate, valuation and improvements, financing colonization, city subdivisions, building operations, transfers, titles, estates, and numerous questions arising out of the ownership and transfer of real estate.

Prerequisite: ES 203 or equivalent. Elective; senior year; third term; 3 credits; 3 lectures or recitations.

A. C. Schmitt

FA 441. Principles of Advertising. Survey of territory and analysis of data; planning of national advertising campaigns; classification of advertising mediums; functions of advertising agencies; advertising appropriations; advertising ethics.

Prerequisite: FA 142. Required in Agriculture and in Commerce; elective to others; junior year; second term; 3 credits; 2 lectures; 1 recitation.

H. T. Vance

FA 443. Principles of Salesmanship. Marketing functions of sales management; principles, policies, and methods of sales departments employed in distribution of manufactured goods; study of functions of sales managers in coordinating sales and production; problems in sales management in domestic and foreign markets.

Prerequisite: FA 141. Required in Commerce; elective to others; senior year; third term; 3 credits; 2 lectures; 1 recitation.

H. T. Vance

BANKING AND FINANCE

FA 143. Credits and Collections. The aim of this course is to teach the student how a bank may be of help to the business man in the safe keeping of funds, paying bills, sound borrowing, the use of collateral security, drafts, bills of exchange and acceptances,

commercial credits, the handling of collections, current assets and current liabilities, financial statements, commercial agencies.

Required in Advertising and Selling, Banking and Finance, and Markets and Marketing; freshman year; third term; 3 credits.

A. C. Schmitt

FA 333. Practical Banking. A combination of banking principles and banking practice under the direction of an experienced banker. Visits of inspection to local banks, lectures by practical bankers on the operation of the various departments. The aim of this course is to familiarize the student with the management and operation of a bank. It is designed particularly for those intending to engage in banking or taking up some financial pursuit. Text supplemented by selected exercises.

Prerequisites: FA 201 or equivalent; ES 311. Elective in Commerce; senior year; second term; 4 credits; 4 recitations.

A. C. Schmitt

FA 431. Corporation Finance. The promotion, organization, financing, and management of corporations; corporate securities and facilities for marketing them; reorganization and receivership; blue sky law and state control.

Prerequisites: ES 203, 311; FA 201. Elective; junior or senior year; first term; 4 credits; 4 lectures or recitations.

A. C. Schmitt

FA 432. Investments. A study of sound and unsound investments; markets and the price of securities; their demand and supply; the computing of earnings; government, state, county, municipal, and corporation bonds and real estate loans as investment securities; the stock exchange.

Elective; senior year; second term; 4 credits; 4 lectures or recitations.

A. C. Schmitt

FA 433. Risk Bearing. A study of the element of risk and uncertainty in business enterprises, and the organizations and means developed for reducing such risks by social control, hedging, insurance, guaranty, suretyship, speculative contracts, cycles of prosperity and depression, forecasting systems.

Elective; junior or senior year; third term; 4 credits; 4 lectures or recitations.

A. C. Schmitt

ORGANIZATION AND MANAGEMENT

FA 331. Business Organization. A course in ownership business organization. General nature of business organization; origin, evolution, and forms of business units; structure and life-history of typical corporations; the corporation and trust problem; public utility corporations.

Required in Commerce; elective to others; junior year; first term; 3 credits; 2 lectures; 1 recitation. *A. C. Schmitt*

FA 332. Business Management. Emphasis is laid on the internal organization and management of a business for the purpose of securing efficiency; departmental organization and coordination; various systems of scientific management studied and compared.

Required in Commerce; elective to others; junior year; second term; 3 credits; 2 lectures; 1 recitation. *A. C. Schmitt*

FA 363. Market Business Practice. This course covers the business management of cooperative societies. It includes book-keeping and cost accounting especially adapted to different types of cooperative associations in the United States, such as creamery associations and cow-testing associations; auditing; banking and finance; depreciation of assets; conduct of membership meetings; annual reports and audits.

Prerequisite: FA 101 or equivalent. Elective in Agriculture; junior year; third term; 3 credits; 1 lecture; 2 recitations.

F. L. Robinson

FA 371. Business Management for Women. The aim of this course is to treat in a practical way the ordinary rules and methods of conducting business affairs. Two distinct phases are emphasized as follows: (a) Finance. Value of money, how savings grow, banking and credit, general principles of investment, loan associations, bonds, stocks, and insurance. (b) Fundamentals of Business Law. The principles of the law of contracts, of negotiable paper, mortgages, real property, and wills.

Elective; junior year; first or third term; 3 credits; 1 lecture; 2 recitations.

F. L. Robinson

FA 381. Business Organization and Management. A condensed course for students other than Commerce. Principles of business organization; types, including partnerships, corporations, and other business units; locating an industry; plant and equipment; buying, receiving, storing, and recording material; financing an enterprise; budgets and reports; banking practice; determination of costs; standardization; wage systems; welfare and employment problems.

Required in Electrical Engineering (second term) and in Industrial Arts; elective to others except Commerce students; third term; 3 credits; 3 lectures or recitations. *A. C. Schmitt*

FA 405, 406. **Seminar in Finance and Administration.** A research course in any field within the department in which the student is especially interested and prepared.

Required in Banking and Finance; senior year; three terms; 1 credit each term; 1 recitation.

POLITICAL SCIENCE

In the courses in Political Science proper the department seeks to instruct in the basic general principles of all government, the construction and operation of modern governments, with particular attention to that of the United States, and the rules and principles which regulate the relations of governments to each other. The courses are planned with the purpose of equipping students for an intelligent participation in governmental affairs. The work culminates in the courses in Advanced American Government and Practical Legislation, designed to instruct in the fundamentals of lawmaking. The work assumes that, as citizens, our students will take a dynamic part in the various activities of government, including lawmaking.

In the Business Law courses the department endeavors to train students for practical business affairs, particularly to give the legal information necessary to prevent the common business errors. Special attention is given to industrial and rural problems. The work in this department of the School of Commerce gives excellent preparation for the study of law.

COURSES

NOTE: The courses in Political Science are arranged in numerical order within the following groups: Business Law, Government.

BUSINESS LAW

PS 163. **Business and Rural Law.** A short course in the laws of business, covering briefly much the same field as PS 201 and PS 202, but applied particularly to the special needs of students. Work for Pharmacy students gives emphasis to strictly business law. Work for Agriculture students stresses farm law. Recitations and discussions.

Required in Pharmacy (sophomore year) and in Farm Crops and Landscape Gardening (senior year); elective to others except Commerce; third term; 3 credits; 3 recitations. *R. R. Hewitt*

PS 201. **Advanced Business Law.** (a) Contracts in General. Requisites, formation, interpretation, and remedies for breach of contracts. (b) Sales of Personal Property. Passage of title, war-

ranties and remedies. Note: Credit will not be given for PS 201 without PS 202 except on special permission from the department.

Required in Commerce; elective to others; sophomore year; first or second term; 4 credits; 4 recitations.

R. R. Hewitt, R. M. Lockenour

PS 202. **Advanced Business Law.** Continuation of PS 201. (c) Negotiable Instruments. Requisites of contract assignment and negotiation. Liability of maker, drawer, acceptor, and indorser. Proceedings to protect rights of parties. (d) Agency. Appointment powers and responsibilities of agents. (e) Partnership and Corporation. Comparison of methods of formation, dissolution, and powers and liabilities of members. (f) Property Classes. Title, abstracts, mortgages, and leases. The case method is used throughout the entire course. Lectures, reports, and discussions.

Required in Commerce (sophomore year) and Logging Engineering (junior year); elective to others; second or third term; 4 credits; 4 recitations.

R. R. Hewitt, R. M. Lockenour

PS 413. **Corporation Law.** A study in Corporation law designed to meet the needs of those who must of necessity transact business largely with and through corporations and cooperative organizations. A study of the nature, classification, manner of creation, organization, powers, membership rights and obligations of members, duties and liabilities of directors and agents, rights of creditors; and dissolution of corporations. A course planned especially for those intending to engage in banking, accounting, or marketing.

Prerequisites: PS 201, 202. Required in Commerce; senior year; third term; 4 credits; 4 recitations.

R. R. Hewitt

PS 601. **Business Law.** Class work same as PS 201, 202, with special research work required in addition.

For graduate students other than Commerce; first term; 4 credits; 4 recitations.

R. R. Hewitt, R. M. Lockenour

PS 602. **Business Law.** Class work same as PS 202; special research work required in addition.

For graduate students other than Commerce; second term; 4 credits; 4 recitations.

R. R. Hewitt, R. M. Lockenour

GOVERNMENT

PS 301. **National Government.** Consideration of the organization, functions, and present-day problems of the American Federal Government.

Required in all curricula except Forestry and Pharmacy; junior or senior year; any term; 3 credits; 3 recitations.

U. G. Dubach, F. A. Magruder, R. M. Lockenour

PS 302. State and Local Government. Consideration of the organization, functions, and present-day problems of state, county, and township government in the United States. The government of Oregon receives special attention.

Required in Commerce, Logging Engineering, and Forestry, (junior year) and in Landscape Gardening and Marketing of Agricultural Products (senior year); second term; 3 credits; 3 recitations.

F. A. Magruder

PS 303. Municipal Government. Consideration of the organization, functions, and present-day problems of city and town government. The cities of the Northwest receive special attention.

Required in Commerce (junior year) and Marketing of Agricultural Products (senior year); elective to others; third term; 3 credits; 3 recitations.

F. A. Magruder

PS 401. International Relations. A brief description of the leading governments of the world and a discussion of their interrelations, with emphasis upon their relations with the United States. General principles of international law, the League of Nations, and current political events are considered.

Required in Commerce, Vocational Education, and Military Science and Tactics; elective to others; junior or senior year; first or third term; 4 credits; 4 recitations.

F. A. Magruder

PS 402. Comparative Governments. A critical study of the governments of the principal countries of Europe with emphasis on modern movements and features of government that are problems in the United States at present. Lectures, reports, and discussions.

Required in General Business and Military Science and Tactics; elective to others; junior or senior year; second term; 3 credits; 3 recitations.

F. A. Magruder

PS 403. Comparative Governments. Continuation of PS 402, covering governments of Canada and the countries of Latin America. Lectures, reports, and discussions.

Elective; junior or senior year; third term; 3 credits; 3 recitations.

U. G. Dubach

PS 404, 405, 406. Seminar in Political Science. This course is given in the form of discussions of current political and legal topics led by the various instructors in the department. Questions pertaining to the American government are considered the first term, legal questions the second, and foreign problems the third term.

Open only to seniors who have completed all sophomore and junior work in Political Science; three terms; 1 credit each term; 1 period.

PS 411. Advanced American Government. Supplementary to PS 301, 302, and 303, giving chief attention to the interpretation of Federal and state constitutions, and the relation of legislation to the constitutions. Court reports are used liberally to show the interpretation of the rights of the people guaranteed in the constitutions and of the powers granted to the government by these instruments.

Prerequisite: PS 301. Elective; senior year; first term; 4 credits; 4 recitations.

U. G. Dubach

PS 412. Practical Legislation. Instruction in practical bill drafting; attention to correct form, and expression of desired content of bills; emphasis on the necessity of preparing laws with reference to prior legislation and court decisions; emphasis on rural and industrial legislation.

Prerequisite: PS 411. Elective; senior year; second term; 4 credits; 4 recitations.

U. G. Dubach

SECRETARIAL TRAINING

The courses offered by this department are for four classes of students: (a) those desiring a thorough training as stenographers and typists; (b) those desiring to go further into the field of court reporting and secretarial training; (c) those desiring to enter the teaching profession; and (d) those commercial teachers desiring advanced training.

The ground covered by the work of this department is as follows: Stenography and Typewriting, one year; Secretarial Training, two years; Convention and Court Reporting, one year; and Methods of Teaching Commerce, one year.

Equipment. The Secretarial Training department is equipped with the latest appliances and fixtures, including the standard types of typewriters, duplicators, mimeographs, dictaphones, mimeoscope, filing cabinets, and adding and bookkeeping machines. Each student is given access to equipment upon payment of a fee required for the course in which he is registered. All equipment and apparatus are kept in constant repair, and students are taught how to keep the apparatus they use in proper order.

COURSES*

NOTE: *The courses in Secretarial Training are arranged in numerical order within the following groups: Stenography, Typing, Office Training, Secretarial Studies.*

STENOGRAPHY

ST 101. **Stenography I.** Theory of manual, Gregg shorthand, lessons one to six inclusive. Principles of shorthand penmanship and phrasing emphasized; practical application of theory principles in sentence dictation at thirty-five words a minute. Typing course ST 111 must be taken concurrently with this course unless student has had an equivalent course.

Required in Secretarial Training; elective to others; freshman year; any term; 3 credits; 4 recitations.

ST 102. **Stenography II.** A continuation of ST 101. Theory of manual, Gregg shorthand, lessons seven to twelve inclusive. Transcription of shorthand plates, Hunter's Graded Readings, lessons one to twelve inclusive; sentence and letter dictation at fifty words a minute. Typing course ST 112 must be taken concurrently with this course unless student has had an equivalent course.

Required in Secretarial Training; elective to others; freshman year; any term; 3 credits; 4 recitations.

ST 103. **Stenography III.** A continuation of ST 102. Theory of manual, Gregg Shorthand, lessons thirteen to twenty inclusive. Dictation at sixty words a minute; transcription. Typing course ST 113 must be taken concurrently with this course unless student has had an equivalent course.

Required in Secretarial Training; elective to others; freshman year; first or third term; 3 credits; 4 recitations.

ST 201. **Applied Stenography and Typing I.** Advanced principles and phrases, Gregg or Pitman Shorthand. Dictation and transcripts covering vocabularies of representative businesses such as law, banking, insurance, publishing, railway, and manufacturing. Advanced typing and effective arrangement of business correspondence.

Prerequisites: ST 103, 113, or equivalent; Eng 106. Required in Secretarial Training; sophomore year; any term; 5 credits; 5 recitations; 5 hours home work; 5 one-hour laboratory periods. Fee \$2.00.

*Less than 9 credits in Stenography or 6 credits in Typing will not be counted toward the bachelor's degree in Commerce.

ST 202. **Applied Stenography and Typing II.** Advanced dictation, legal forms, newspaper and magazine articles. Court and convention reporting introduced. Sections for Gregg and Pitman students.

Prerequisite: ST 201 or equivalent. Required in Secretarial Training; sophomore year; second or third term; 5 credits; 5 recitations; 5 hours home work; 5 laboratory periods. Fee \$2.00.

TYPING

ST 111. **Typing I.** Touch typing. Theory and practice of touch typing, covering mastery of alphabet and numerals. Finger gymnastics, rhythm drills, dictation exercises. A speed of twenty words a minute is required. Required for ST 101 students.

Required in Secretarial Training; elective to others; freshman year; first term; 2 credits; 5 one-hour laboratory periods; 1 hour home assignment. Fee \$2.00.

ST 112. **Typing II.** Continuation of ST 111. Drill. Writing paragraphs, continuous matter. Punctuation and mechanical arrangement of business correspondence. A speed of thirty-five words a minute is required. Required of ST 102 students.

Required in Secretarial Training; elective to others; freshman year; any term; 2 credits; 5 one-hour laboratory periods; 1 hour home assignment. Fee \$2.00.

ST 113. **Typing III.** Continuation of ST 112. Legal forms, tabulating, centering, manifolding, and speed practice. Speed certificates granted. A speed of fifty words a minute is required. Required of ST 103 students.

Required in Secretarial Training; elective to others; freshman year; third term; 2 credits; 5 one-hour laboratory periods; 1 hour home assignment. Fee \$2.00.

ST 261. **Expert Typing.** Designed to give expert finger training. Emphasis on artistic typing and rapid tabulating, billing, and manifolding, with absolute accuracy. A speed of sixty-five words a minute is required. Proficiency certificates for speed and accuracy will be granted.

Prerequisite: ST 113. Elective, primarily for other than Commerce students; sophomore year; first or third term; 2 credits; 5 laboratory periods; 1 hour home assignment. Fee \$2.00.

OFFICE TRAINING

ST 203. **Office Training for Stenographers.** Training course in office practice and business procedure; advanced dictation; study and use of office appliances commonly used in the modern

office, such as the mimeograph, mimeoscope, adding machines, and filing equipment.

Prerequisite: ST 202 or equivalent. Required in Secretarial Training; sophomore year; first or third term; 5 credits; 2 lectures; 4 two-hour laboratory periods. Fee \$2.00.

ST 251. **Office Methods and Appliances I.** Designed for Commerce students not taking stenography. Study and use of modern office appliances such as mimeoscope, mimeograph, dictaphones, calculating and bookkeeping devices. Filing and office routine.

Prerequisites: ST 113, FA 103. Required in Commerce; sophomore year; first term; 2 credits; 1 lecture; 4 one-hour laboratory periods; 1 hour home assignment. Fee \$2.00.

ST 252. **Office Methods and Appliances II.** Continuation of ST 251. Practice and principles of scientific office management covering organization, arrangement, and operation, with special consideration of the employment, training, and payment of office workers. Study and drill in office efficiency problems and business ethics.

Prerequisite: ST 251. Required in Commerce; sophomore year; second term; 2 credits; 1 lecture; 4 one-hour laboratory periods. Fee \$2.00.

ST 253. **Office Methods and Appliances III.** Continuation of ST 252.

Required in Commerce; sophomore year; third term; 2 credits; 1 lecture; 4 one-hour laboratory periods. Fee \$2.00.

SECRETARIAL STUDIES

ST 401. **Reporters' Course I.** Designed for those having completed ST 203 and desiring to specialize in court or convention reporting.

Prerequisite: Two years in Stenography or equivalent. Elective; junior or senior year; first term; 3 credits; 2 recitations; 3 one-hour laboratory periods. Fee \$1.00.

ST 402. **Reporters' Course II.** A continuation of ST 401.

Elective; junior or senior year; second term; 3 credits; 2 recitations; 3 one-hour laboratory periods. Fee \$1.00.

ST 403. **Reporters' Course III.** A continuation of ST 402. Verbatim reporting of addresses, lectures, and talks given on the campus. Accurate transcripts to be made.

Elective; junior or senior year; third term; 3 credits; 2 recitations; 3 one-hour laboratory periods. Fee \$1.00.

ST 404, 405, 406. **Seminar in Secretarial Training.** Research and survey course in the organization and practice of a modern office in which the student is especially interested and prepared.

Elective in Secretarial Training; senior year; any term; 1 credit each term; 1 period.

ST 411. Secretarial Studies. Continuation of ST 203. Training in the duties of a private secretary, managing callers, handling correspondence; outlines and reports; sources of information; editing and proof reading; appointments, diaries, and accounts; machine studies; practical use of modern office appliances in commercial work.

Prerequisite: ST 203. Required in Secretarial Training; senior year; first term; 5 credits; 2 lectures; 4 two-hour laboratory periods. Fee \$2.00.

ST 412. Secretarial Practice. Continuation of ST 411.

Required in Secretarial Training; senior year; second term; 3 credits; 9 hours a week actual practice in College administrative offices.

School of Engineering and Mechanic Arts

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
GRANT ADELBERT COVELL, M.E., Dean of the School of Engineering and
Mechanic Arts.
RUTH MARGUERITE APPELMAN, Secretary to the Dean.

Civil Engineering

STUART HOBBS SIMS, B.S., Professor of Civil Engineering.
SAMUEL MICHAEL PATRICK DOLAN, C.E., Associate Professor of Civil
Engineering.
DEXTER RALPH SMITH, B.S., Assistant Professor of Civil Engineering.
BURDETTE GLENN, B.S., Assistant Professor of Civil Engineering.
GLENN WILLIS HOLCOMB, B.S., Instructor in Civil Engineering.
CHARLES ARTHUR MOCKMORE, B.S., Instructor in Civil Engineering.
ARTHUR PUTMAN CRAMER, B.S., Instructor in Civil Engineering.

Electrical Engineering

RICHARD HAROLD DEARBORN, A.B., M.E., Professor of Electrical En-
gineering.
LAWRENCE FISHER WOOSTER, B.S., Professor of Applied Electricity.
FRED ORVILLE McMILLAN, M.S., Assistant Professor of Electrical En-
gineering.
HAROLD COCKERLINE, B.S., Assistant Professor of Electrical Engineer-
ing.
BENJAMIN BURTON BESSESEN, B.S., Instructor in Electrical Engineer-
ing.
BENJAMIN HODGE NICHOLS, B.S., Instructor in Electrical Engineering.
ARTHUR LEMUEL ALBERT, B.S., Instructor in Electrical Engineering.

Highway Engineering

GORDON VERNON SKELTON, C.E., Professor of Highway Engineering.

Hydraulics and Irrigation Engineering

HARRY STANLEY ROGERS, B.S., Professor of Hydraulics and Irrigation
Engineering.
LESLIE ELIJAH BRIGHAM, B.S., Assistant Professor of Hydraulics and
Irrigation Engineering.

Industrial Arts

HENRY CLAY BRANDON, A.M., Professor of Industrial Arts; Director of Shops.

AMBROSE ELLIOTT RIDENOUR, B.S., Instructor in Foundry Practice.

MARTIN LOUIS GRANNING, Instructor in Automobile Mechanics.

GLENN HARTMAN HILL, Instructor in Machine Shops.

DARWIN GREENE THAYER, B.S., Instructor in Industrial Arts.

WILLIAM HAMILTON HORNING, Instructor in Forging.

Mechanical Engineering

JOHN RANDOLPH DUPRIEST, B.S., M.M.E., Professor of Mechanical Engineering.

WALLACE HOPE MARTIN, M.E., Professor of Heat Engineering.

MARK CLYDE PHILLIPS, B.M.E., Associate Professor of Mechanical Engineering; Superintendent of Heating.

RAY BOALS, B.S., Assistant Professor of Mechanical Engineering.

MORRIS WENK, A.B., E.E., Assistant Professor of Mechanical Engineering.

ALFRED WILLIAM BECHLEM, B.S., Instructor in Mechanical Engineering.

EARL CLARK WILEY, B.S., Instructor in Mechanical Drawing.

ARTHUR CHAPIN COONRADT, A.B., Instructor in Mechanical Engineering.

ALFRED CLINTON HARWOOD, Mechanician, Engineering Laboratory.

Mechanics and Materials

SAMUEL HERMAN GRAF, M.S., Professor of Mechanics and Materials.

CHARLES EDWIN THOMAS, M.E., Associate Professor of Mechanics and Materials.

IVAN FREDERICK WATERMAN, C.E., Assistant Professor of Mechanics and Materials.

JAMES CAREY OTHUS, M.E., Instructor in Mechanics and Materials.

Baccalaureate Degrees. Four-year curricula leading to the degree of Bachelor of Science are offered in the School of Engineering as follows: a curriculum in Civil Engineering, with a senior option in Highway Engineering; a curriculum in Electrical Engineering; a curriculum in Mechanical Engineering; a curriculum in Industrial Arts.

Requirements for Graduation. In each of the four baccalaureate degree curricula offered in the School of Engineering, 207 college credits are required, of which 192 are to be academic credits, 12 are to be credits in military drill, and 3 are to be credits in physical education.

Common Freshman Year. All students registered in Civil, Electrical, and Mechanical Engineering have the same work throughout the freshman year. The common first year curriculum has been arranged to permit students to wait until the beginning of the second year before deciding finally upon the particular branch of engineering they wish to follow. Many students enter college without a definite idea of what line of work they wish to pursue. It is thought that after spending one year in college, a student will be able to make a more intelligent choice in his course.

Advanced Degrees. The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer, is offered to graduates of the College, or other colleges of equal rank, who have attained the degree of Bachelor of Science in the corresponding engineering curriculum, and met the College requirements for graduate study. These requirements specify one full year of resident work amounting to 48 college credits, including an acceptable thesis. (See pages 38-39.)

CURRICULA IN ENGINEERING

(*B.S. Degree*)

Freshman Year

(For students in Civil, Electrical and Mechanical Engineering. For the freshman year in Industrial Arts see page 234.)

	Term		
	1st	2d	3d
Elementary Analysis (Mth 131)	5	5	5
Plane Trigonometry (Mth 111)	5	5	5
Elementary Analysis (Mth 132)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Linear Drawing and Lettering (ME 111)	2	2	2
Elementary Mechanical Drawing (ME 112)	2	2	2
Mechanical Drawing (ME 114)	2	2	2
Engineering Problems (CE 101; EE 101; ME 101)	2	2	2
Gymnastics and Calisthenics (PEm 111, 112, 113)	2	2	2
Military Science and Tactics	2	2	2
	<u>17½</u>	<u>17½</u>	<u>17½</u>

CIVIL ENGINEERING

Sophomore Year

Differential and Integral Calculus (Mth 251, 252, 253)	4	4	4
General Chemistry (Ch 101, 102, 103)	3	3	3
Practical Public Speaking I (PSP 254)	3	3	3
Curves and Earthwork (CE 231, 232)	5	2	2
Physics (Ph 221, 222, 223)	3	3	3
Steam and Gas Machinery (Theory) (ME 232)	3	3	3
Steam and Gas Machinery (Laboratory Practice) (ME 233)	2	2	2
Gymnastics and Calisthenics (PEm 211, 212, 213)	2	2	2
Military Science and Tactics	2	2	2
	<u>17½</u>	<u>17½</u>	<u>17½</u>

Junior Year

	Term		
	1st	2d	3d
Mechanics (MM 351, 352)	3	---	3
Strength of Materials (MM 353)	---	3	---
Materials of Engineering (MM 311)	---	3	---
Hydrology (Hyd 311), Hydraulics (Hyd 312, 313)	3	3	3
Masonry and Foundations (CE 372)	---	3	---
Structural Analysis (CE 381)	---	---	5
Roads and Pavements (HE 313)	5	---	---
Introduction to Economics (ES 391)	3	---	---
Principles of Accounting for Engineers (FA 385)	---	3	---
National Government (PS 301)	---	---	3
Electives	3	3	3
	17	18	17

Senior Year

General Geology (G 301a)	3	---	---
Structural Engineering (CE 482), Structural Design (CE 483, 484)	4	4	5
Seminar (CE 491, 492, 493)	1	1	1
Reinforced Concrete (CE 471)	---	5	---
Reclamation Engineering (Hyd 413)	---	---	3
Hydraulic Machinery (Hyd 411)	3	---	---
Railroad Engineering (CE 433)	3	---	---
Direct Currents (EE 251), Alternating Currents (EE 252)	---	3	3
Electives	3	4	4
	17	17	16

Senior Year

(Highway Engineering Option)

Structural Engineering (CE 482), Structural Design (CE 483, 484)	4	4	5
Contracts and Specifications (HE 427)	---	---	3
Highway Engineering (HE 411, 412, 413)	4	3	4
Highway Materials Laboratory (MM 426)	3	---	---
Economics of Highway Construction (HE 416)	3	---	---
Reinforced Concrete (CE 471)	---	5	---
Seminar (CE 491, 492, 493)	1	1	1
Electives	3	3	3
	18	16	16

ELECTRICAL ENGINEERING

Sophomore Year (1925-26)

Introduction to Electrical Engineering (EE 201, 202, 203)	3	3	3
Differential, Integral Calculus (Mth 251, 252, 253)	4	4	4
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Machine Shop (IA 263)	2	---	---
Plane Surveying (CE 124, 227)	---	2	2
Gymnastics and Calisthenics (PEm 211, 212, 213)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Junior Year

	Term		
	1st	2d	3d
Electrical Engineering (EE 301, 302, 303)	3	3	3
Electrical Laboratory (EE 321, 322, 323)	3	3	3
Mechanics (MM 351, 352)	3	3	---
Strength of Materials (MM 353)	---	---	3
Materials of Engineering (MM 311)	3	---	---
Hydraulics (Hyd 321)	---	3	---
Hydraulic Power Plants (Hyd 322)	---	---	3
Heat Power Engineering (ME 331, 332, 333)	3	3	3
Electives	3	3	3
	18	18	18

Senior Year

Electrical Engineering (EE 401, 402, 403)	3	3	3
Electrical Design (EE 411, 412, 413)	1	1	1
Electrical Laboratory (EE 421, 422)	3	3	---
Introduction to Economics (ES 391)	3	---	---
Business Organization and Management (FA 381)	---	3	---
National Government (PS 301)	---	---	3
Practical Public Speaking I (PSp 254)	---	---	3
Electives	6	6	6
	16	16	16

MECHANICAL ENGINEERING

Sophomore Year (1925-26)

Differential, Integral Calculus (Mth 251, 252, 253)	4	4	4
Engineering Physics (Ph 221, 222, 223)	3	3	3
Elements of Heat Engineering (ME 221)	3	---	---
Steam Engines (ME 222)	---	3	---
Descriptive Geometry (ME 211)	2	---	---
Advanced Mechanical Drawing (ME 212)	---	2	---
Mechanism (ME 213)	---	---	3
Plane Surveying (CE 226)	3	---	---
Machine Shop (IA 262)	---	---	2
Practical Public Speaking I (PSp 254)	---	3	---
National Government (PS 301)	---	---	3
Gymnastics and Calisthenics (PEm 211, 212, 213)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Junior Year (1925-26)

Heat Power Engineering (ME 321, 322)	3	3	---
Mechanics (MM 351, 352)	3	---	3
Strength of Materials (MM 353)	---	3	---
Materials of Engineering (MM 311)	---	---	3
Direct Currents (EE 251), Alternating Currents (EE 252)	3	3	---
Introduction to Economics (ES 391)	---	3	---
National Government (PS 301)	---	---	3
Practical Public Speaking I (PSp 254)	3	---	---
Mechanical Engineering Laboratory (ME 352, 353)	---	2	2
Power Plant Design (ME 442)	2	---	---
Contracts and Specifications (HE 427)	---	---	3
Electives	3	3	3
	17	17	17

Senior Year (1925-26)

	Term		
	1st	2d	3d
Power Plant Engineering (ME 432, 433)	3	3	3
Power Plant Design (ME 442, 443) .....	.....	2	2
Machine Design (ME 411, 412, 413)	3	3	3
Wood and Steel Structures (CE 488)	3	.....	.....
Reinforced Concrete and Foundation Design (CE 473) .....	.....	.....	3
Contracts and Specifications (HE 427)	3	.....	.....
Engineering Laboratory (ME 451, 452, 453)	2	2	2
Steam Turbines (ME 323) or Gas Engineering (ME 421) .....	.....	.....	3
Principles of Accounting for Engineers (FA 385) .....	.....	3	.....
Mechanical Engineering Seminar (ME 481, 482, 483)	1	1	1
Electives	3	3	3
	18	17	17

INDUSTRIAL ARTS

Freshman Year

Shop Drawing (IA 191, 192, 193)	2	2	2
Cabinet Making (IA 111, 112, 113)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Commercial Geography (ES 101)	4	.....	.....
Plane Trigonometry (Mth 111) .....	.....	4	.....
Gymnastics and Calisthenics (PEm 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
Approved electives .....	.....	.....	4
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Sophomore Year

Industrial Arts Drawing (A 231)	2	.....	.....
Industrial Arts Design (A 232) .....	.....	2	.....
House Planning (Ar 331) .....	.....	.....	3
Patternmaking (IA 213)	3	.....	.....
History of Western Civilization II and III (Hst 212, 213)	3	3	.....
Recent History of the United States (Hst 126) .....	.....	.....	3
Engineering Physics (Ph 111, 112, 113)	3	3	3
Mill Work (Machine Wood Working) (IA 223) .....	.....	3	.....
Carpentry (IA 222) .....	.....	.....	3
Gymnastics and Calisthenics (PEm 211, 212, 213)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
Approved electives	4	4	3
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Junior Year

Special Methods in Manual Training (IED 341)	3	.....	.....
Forging (IA 351)	3	.....	.....
Elementary Psychology (Psy 301)	3	.....	.....
Mechanical Drawing (ME 112, 114)	2	2	.....
Descriptive Geometry (ME 113) .....	.....	.....	3
Hammered Metal Work (IA 352) .....	.....	3	.....
Introduction to Education (Ed 302) .....	.....	3	.....
Foundry Practice (IA 242)	3	.....	.....
Wood Turning (IA 333) .....	.....	2	.....
Educational Psychology (Psy 322) .....	.....	.....	3
Commercial Woods (F 334) .....	.....	.....	3
Approved electives	3	7	8
	17	17	17

	Term		
	1st	2d	3d
Machine Shop (IA 461, 462)	3	3	....
Introduction to Economics (ES 391)	3	....	....
Materials of Engineering (MM 311)	3	....	....
Advanced Mechanical Drawing (IA 493) .....	....	3	....
Business Organization and Management (FA 381) .....	....	....	3
Vocational Education (Ed 323) .....	....	2	....
Hydraulics (Hyd 321) .....	....	3	....
Automobile Mechanics (IA 182, 183) .....	....	3	3
National Government (PS 301) .....	....	....	3
Supervised Teaching in Industrial Arts (TEd 462)	5	....	....
Electives	3	3	8
	<hr/>	<hr/>	<hr/>
	17	17	17

CIVIL ENGINEERING

Graduates in Civil Engineering who enter that profession will be expected to render an increasing service in some one, or more, of its branches. These are: surveying and geodesy; highway, railroad, hydraulic, structural, sanitary, and municipal engineering; and valuation. More specifically, the work of the civil engineer consists of the economic location, design, construction, maintenance, operation, and oftentimes the appraisal, of systems of highways, railroads, water supply, irrigation, water power, sewerage and sewage disposal; the economic development and improvement of cities, rivers, and harbors; the economic design and construction of foundations and of the masonry, steel, or wooden structures which they support. Many civil engineering graduates enter business; and, in addition, the engineering profession is being called upon, at an accelerating rate, for service in administrative and in governmental as well as in technical fields.

As indicated by the trend of engineering education, educators are well agreed that the engineering school can best serve by providing a thorough training in the fundamentals of the basic sciences and economics; by providing specific opportunities for the broadening of its students and the development of their characters.

Curriculum and Pedagogy. In preparing the degree curriculum in Civil Engineering the aim has been threefold. First, to provide ample opportunity for the student to learn thoroughly the fundamental principles of mathematics, physics, mechanics, and economics; to understand the application of these principles to engineering problems, both old and new; to obtain knowledge of the best professional practice; and to acquire a technique which will qualify him to compete successfully after entrance upon professional work. Second, to provide opportunity for the student to gain an appreciation of the professional field of engineering and

to inculcate in him high ideals. Third, to provide opportunity for the student to form an acquaintance with, and an interest in, non-technical subjects of general interest which are valuable in increasing his breadth of knowledge and power of appreciation.

The pedagogy in each of the component courses which make up the curriculum has been carefully planned to effect as rapid a rate of thorough learning as possible; to teach the student how to study; how to analyze, how to record his thoughts efficiently, and to communicate them logically, clearly and effectively, whether in writing or orally; to cultivate effective personal qualities and business habits, scientific and personal honesty, courage, loyalty, industry, cheerfulness; and to develop his judgment and balance in specific ways.

Equipment. The department is provided with excellent quarters and equipment for performing its work thoroughly and efficiently. The entire third floor of Apperson Hall, a large portion of the Engineering Laboratory, and a large room on the ground floor of Mechanic Arts Building are devoted to its uses.

The quarters in Apperson Hall are used for classrooms, drawing and designing rooms, and offices. All are of sufficient size, are well lighted, and thoroughly equipped with modern equipment, which includes drafting machines, railroad curves, beam compasses, planimeters, pantographs, and the like, in addition to an excellent collection of maps and plans for illustrative purposes.

The instrument room is located on the ground floor of Mechanic Arts Building. The equipment consists of twenty-nine transits, twenty-five levels, sixteen plane tables, six Price current meters, together with an adequate supply of stadia, level, and line rods, hand levels, tapes, and all the necessary minor equipment. Each of the instruments is of high-grade American make and is kept in its individual locker with all of the necessary small equipment sufficient to outfit a surveying party.

In addition use is made of the Electrical, Hydraulic, Materials Testing, and Mechanical laboratories.

COURSES

CE 101. Engineering Problems. A course of lectures and problems, dealing in an elementary way with the general field of engineering. The purpose of the course is to broaden the student's knowledge of the kind of problems encountered in the various branches of engineering as a means of helping him to decide whether he wishes to follow engineering work and if so what branch of work he prefers.

Required in Civil, Electrical, and Mechanical Engineering; freshman year; any term; 2 credits; 1 lecture; 1 three-hour problem period. Fee \$0.50.

CE 121. Plane Surveying. Theory, use, and adjustment of level and transit. Measurement and subdivision of land.

Required in Landscape Gardening (freshman year, first or third term), Military Engineering (sophomore year, first term), and in Mining Engineering (sophomore year, third term); 5 credits; 2 recitations; 9 periods field work. Fee \$1.00.

CE 122. Plane Surveying. A continuation of CE 121. A study of surveying problems as related to subdivision of public land, farm, and city surveying; special problems and methods; further practice in use of instruments; note-keeping.

Prerequisite: CE 122. Required in Landscape Gardening; (sophomore year) and in Military Engineering (freshman year); second term; 4 credits; 2 recitations; 6 periods field work. Fee \$1.00.

CE 123. Plane Surveying. Use of stadia and of plane table; topographical mapping and drawing; determination of meridian by stellar and by solar observation.

Prerequisite: CE 122. Required in Landscape Gardening; sophomore year; third term; 5 credits; 2 recitations; 9 periods field work. Fee \$1.25.

CE 124. Plane Surveying. Theory, use, and adjustments of tape, compass, and level.

Required in Electrical Engineering; sophomore year; second term; 2 credits; 1 recitation; 3 periods field work. Fee \$1.00.

CE 125. Plane Surveying. Theory, use, and adjustments of tape, compass, and level.

Required in Forestry and Logging Engineering; freshman year; second term; 3 credits; 1 recitation; 6 periods field work. Fee \$1.00.

CE 126. Plane Surveying. A continuation of CE 125. Theory, use, and adjustment of transit. Measurement and subdivision of land.

Prerequisite: CE 125. Required in Forestry and Logging Engineering; freshman year; third term; 5 credits; 2 recitations; 9 periods field work.

CE 211. Engineering Drawing. Use of standard conventional symbols, free-hand lettering.

Required in Forestry and Logging Engineering (sophomore year) and in Military Engineering (freshman year); first term; 3 credits; 1 lecture; 8 periods laboratory instruction. Fee \$1.25.

CE 226. **Plane Surveying.** Theory, use, and adjustment of engineer's level and transit.

Required in Mechanical Engineering (sophomore year); elective in Soils (senior year); first term; 3 credits; 1 recitation; 6 periods field work. Fee \$1.00.

CE 227. **Plane Surveying.** A continuation of CE 124. Theory, use, and adjustment of transit.

Prerequisite: CE 124. Required in Electrical Engineering; sophomore year; third term; 2 credits; 1 recitation; 3 periods field work. Fee \$1.00.

CE 229. **Precise Surveying and Geodesy.** Instruction in precise leveling, triangulation, base line measurement, stellar and solar observations.

Prerequisite: CE 123. Elective after freshman year; any term; 3 credits; 1 recitation; 6 periods field work. Fee \$1.00.

CE 231. **Curves and Earthwork.** Instruction and field work in simple curves and earthwork measurement and computation.

Prerequisite: CE 123. Required in Civil Engineering; sophomore year; first term; 5 credits; 9 periods laboratory and field work. Fee \$1.25.

CE 232. **Curves and Earthwork (continued).** Instruction and field work in compound, easement, and parabolic curves as related to railroads, highways, and canals. Complete survey of a transportation line, reconnaissance, preliminary, and location surveys; estimates of quantities.

Prerequisite: CE 231. Required in Civil Engineering; sophomore year; second term; 2 credits; 6 periods field work. Fee \$1.25.

CE 372. **Masonry and Foundations.** Study and design of masonry foundations, walls, piers, dams, and arches.

Required in Civil Engineering; junior year; second term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$1.50.

CE 381. **Structural Analysis.** Graphical and algebraic analysis of simple roof and bridge structures.

Prerequisite: MM 351. Required in Civil Engineering; junior year; third term; 5 credits; 3 recitations; 6 periods laboratory work. Fee \$1.50.

CE 387. **Structural Analysis.** Analysis of roof trusses.

Prerequisite: MM 351. Required in Military Engineering; junior year; third term; 2 credits; 1 recitation; 3 periods laboratory work. Fee \$1.00.

CE 433. **Railroad Engineering.** A study of methods in railway construction, maintenance, and valuation, of standard struc-

tures, trestles, tunnels, culverts, minor bridges, ballast, rails and rail fastenings, yards, terminals, etc.

Prerequisite: CE 232. Required in Civil Engineering; senior year; first term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$1.00.

CE 471. **Reinforced Concrete.** Study and design of slabs, beams, and columns of reinforced concrete.

Prerequisite: MM 353. Required in Civil and Highway Engineering; senior year; second term; 5 credits. Fee \$1.00.

CE 472. **Concrete Building Design.** Study of various types and design of typical structural elements.

Prerequisite: CE 471. Required in Military Engineering (junior year, second term); elective in Civil Engineering (senior year, third term); 3 credits; 9 periods laboratory work. Fee \$1.50.

CE 473. **Reinforced Concrete and Foundation Design.** Fundamental principles of reinforced concrete applied to design of power stations and machinery beds.

Prerequisite: MM 353. Required in Mechanical Engineering; senior year; third term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.00.

CE 482. **Structural Engineering.** Continuation of CE 381. Study of stresses in simple bridge trusses; influence lines; fundamental principles of design of structural members and connections.

Prerequisite: CE 381. Required in Civil, Highway, and Military Engineering; senior year; first term; 4 credits; 2 recitations; 6 periods laboratory work. Fee \$1.50.

CE 483. **Structural Design.** Design and estimate of plate girder, steel roof, and bridge trusses.

Prerequisite: CE 482. Required in Civil, Highway, and Military Engineering; senior year; second term; 4 credits; 2 recitations; 6 periods laboratory work. Fee \$1.50.

CE 484. **Structural Design.** Continuation of CE 483. Design of voussoir and elastic arches.

Prerequisite: CE 483. Required in Civil, Highway, and Military Engineering; senior year; third term; 5 credits; 2 recitations; 9 periods laboratory work. Fee \$1.50.

CE 485. **Advanced Structural Analysis.** A study of statically indeterminate structures.

Prerequisite: CE 381. Elective; senior year; second term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.50.

CE 486. **Elastic Deformations and Secondary Stresses.** A continuation of CE 485.

Prerequisite: CE 485. Elective; senior year; third term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.50.

CE 488. **Wood and Steel Structures.** Design of mill buildings.

Prerequisite: CE 387. Required in Mechanical Engineering; senior year; first term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.50.

CE 489. **Trusses and Towers.** Design of steel roof trusses and transmission towers.

Optional in Electrical Engineering; senior year; first term; three credits; 1 recitation; 6 periods laboratory work. Fee \$1.00.

CE 491, 492, 493. **Seminar.** The members of the senior classes in Civil and Highway Engineering and the departmental faculty constitute the seminar. The purposes of the seminar are to examine current engineering literature and practice and to provide additional practice in oral and written English.

Required in Civil, Highway, and Military Engineering; senior year; three terms; 1 credit each term; 1 lecture. Fee \$2.00.

ELECTRICAL ENGINEERING

This curriculum is designed especially to train the young engineer in the theory of his profession, such practical work as is given in shop and laboratory being subordinated to this end. Practical acquaintance with actual conditions can be acquired only in the field during vacation and after graduation. For this reason, and in order to supplement his college education, the student is urged to spend at least a part of his vacation in some line of electrical industry.

Equipment. The three laboratories of this department occupy the first floor of Apperson Hall. The sophomore laboratory has facilities for illustrating the fundamentals of electricity as well as for accurate measurements and tests of a more refined character, galvanometers, standard cells, standard instruments, inductances, capacities, storage batteries, etc. The general power laboratory has alternating and direct current generators and motors of all usual types, supplemented by special machines and their auxiliaries. These machines are mounted on five concrete platforms each five feet by twenty-four feet. The main source of power is a 100-horse-power three-unit synchronous motor-generator set from which 110 to 220 volt power is available for D. C. and A. C. experiments. This power is supplemented by three-phase service from

a transmission line. The third laboratory with one 100 KVA, 350,000 volt transformer, one 10 KVA, 110,000 volt transformer, oscillograph, sphere gaps, etc., is well equipped for high tension experiments.

COURSES

EE 101. Engineering Problems. A course of lectures and problems dealing in an elementary way with the general field of engineering. The purpose of the course is to broaden the student's knowledge of the kind of problems encountered in the various branches of engineering as a means of helping him decide whether he wishes to follow engineering work and if so what branch of work he prefers.

Required in Civil, Electrical, and Mechanical Engineering; freshman year; any term; 2 credits; 1 lecture; 1 three-hour problem period. Fee \$0.50.

EE 201, 202, 203. Introduction to Electrical Engineering. An introduction to the study of electrical engineering problems, including measuring instruments, connections, and circuits.

Required in Electrical Engineering; sophomore year; three terms; 3 credits each term; 2 lectures; 1 three-hour laboratory period. Fee \$2.50 a term. *B. B. Bessesen, A. L. Albert*

EE 251. Direct Currents. A preliminary electrical course for non-electrical engineering students, covering the fundamentals of direct current circuits and direct current machines.

Prerequisites: Ph 111, 112, 113. Required in Mechanical Engineering (junior year, first term) and in Military Engineering (sophomore year, first term); elective to others (first or second term); 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$2.50. *B. H. Nichols*

EE 252. Alternating Currents. A continuation of EE 251, covering alternating current circuits and alternating current machines.

Required in Civil and Mechanical Engineering (junior year, second term), and in Military Engineering (sophomore year, second term); elective to others (second or third term); 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$2.50. *B. H. Nichols*

EE 253. Electrical Applications. A continuation of EE 252, covering the application of electricity to special classes of service, the selection of motors for different service conditions, and the operation and control of electrical machines.

Elective; junior year; third term; 3 credits; 2 lectures; 1 three-hour laboratory period. Fee \$2.50. *B. H. Nichols*

EE 301, 302, 303. **Electrical Engineering.** A study of electrostatics, electromagnetism, and direct alternating current machinery.

Required in Electrical Engineering; junior year; three terms; 3 credits each term; 3 recitations. *L. F. Wooster*

EE 321, 322, 323. **Electrical Laboratory.** The testing and determination of direct current machinery characteristics; parallel operation and loading back tests; wave form study; alternating current measurements; and an introduction to alternating current machinery.

Required in Electrical Engineering; junior year; three terms; 3 credits each term; 1 four-hour laboratory period. Fee \$3.00 each term. *H. Cockerline*

EE 401, 402, 403. **Electrical Engineering.** An analysis of electric-power generation, transmission, and distribution with special reference to the technical, economic, and financial problems involved.

Required in Electrical Engineering; senior year; three terms; 3 credits each term; 3 lectures. *R. H. Dearborn*

EE 411, 412, 413. **Electrical Design.** Design and computations supplementary to courses EE 401, 402, 403.

Required in Electrical Engineering; senior year; three terms; 1 credit each term; 1 three-hour period. *R. H. Dearborn*

EE 421, 422. **Electrical Laboratory.** Alternating current machinery testing in accordance with the standards of the American Institute of Electrical Engineers; study of phenomena with the oscillograph; alternating current wave analysis from oscillograms taken in the laboratory.

Required in Electrical Engineering; senior year; first and second terms; 3 credits each term; 1 four-hour laboratory period. Fee \$3.00 each term. *F. O. McMillan*

EE 431. **Electric Lighting.** Study of electric lamps and their application to exterior and interior illumination.

Elective; senior year; first term; 2 credits; 2 recitations.

L. F. Wooster

EE 432. **Industrial Lighting.** Problems in the application of modern ideas of illumination to industrial conditions.

Elective; senior year; second term; 2 credits; 1 recitation. *L. F. Wooster*

EE 442. **Electric Railways.** Study of the application of electricity to street and interurban railways; traffic conditions; rolling stock; speed time curves.

Elective; senior year; second term; 2 credits; 2 recitations.

L. F. Wooster

EE 443. **Railway Electrification.** A study of conditions governing the electrification of trunk lines.

Elective; senior year; third term; 3 credits; 3 lectures.

L. F. Wooster

EE 452. **Electrical Transients.** Theoretical and practical study of direct and alternating current, single energy, and double transients in circuits and machines having both fixed and variable circuit constants.

Elective; senior year; second term; 3 credits; 1 lecture; 1 recitation; 1 three-hour laboratory period.

F. O. McMillan

EE 453. **High Voltage Engineering.** The study and experimental investigation of high voltage and high frequency phenomena; special attention to insulation and corona problems as applied to transmission.

Elective; senior year; third term; 3 credits; 2 recitations; 1 four-hour laboratory period. Fee \$3.00.

F. O. McMillan

EE 462. **Principles of Telephony.** A general study of wire and carrier wave telephony including commercial, traffic, and engineering problems. Special attention given to transmission theory, inductive interference and related subjects.

Elective; senior year; second term; 3 credits; 3 lectures.

A. L. Albert

EE 481, 482, 483. **Seminar.** Presentation of abstracts and discussion of articles in the current electrical periodicals.

Elective; senior year; three terms; 1 credit each term; 1 recitation.

R. H. Dearborn

EE 493. **Thesis.** A course, elective by permission, for those whose records indicate ability to complete a satisfactory thesis.

Elective; senior year; third term; 3 credits.

R. H. Dearborn

HIGHWAY ENGINEERING

There are few lines of public endeavor where more money is being spent, or where a higher degree of technical skill and training is required, than in the field of highway engineering. The purpose of these courses is to meet the demand in this state and throughout the Northwest for men equipped to take charge of road and street construction and maintenance work. In addition to the opportunity for useful and honorable service, no field, it is believed, offers greater encouragement in a financial way to the young man of ambition and ability.

Thorough theoretical instruction is accompanied by as much laboratory and field practice as possible. The curriculum includes such basic studies as Mathematics, Chemistry, Physics, Drawing, Materials of Engineering, Applied Mechanics, and Hydraulics, in addition to the technical work given by this department.

In the study of highways, special reference is made to the conditions and needs of Oregon. Besides study of the higher types of roads, due consideration is given to the construction and maintenance of earth, gravel, and broken-stone roads. In consequence of the vast area of the state, this class of roads must, of necessity, constitute the greater part of its highways for many years.

Equipment. The equipment of the department is modern and adequate. The department of Mechanics and Materials is equipped with modern testing laboratories, including the best cement- and highway-testing machinery, thus affording students in Highway Engineering the opportunity of studying by direct observation and experiment the strength and properties of the various engineering materials.

COURSES

HE 313. Roads and Pavements. A study of the fundamental principles of location, construction, and maintenance of roads; materials used in road and street building; asphalt, brick, wood block, stone, concrete, and other types of pavements. This course is given in connection with a laboratory course, MM 312.

Required in Civil and in Military Engineering; junior year; first term; 5 credits; 5 recitations. *G. V. Skelton*

HE 411. Highway Engineering. Economic grades and proper location for different soils and surfacing materials; surface and sub-surface drainage; culvert design and construction; construction and maintenance of earth, sand-clay, gravel, macadam, concrete, brick and other types of roads; dust preventives and road binders; reconnaissance, surveys, estimates, plans, and specifications; organization of construction and engineering forces; cost data; methods of handling work.

Prerequisite: HE 313. Senior year; first term; 4 credits; 2 recitations; 2 three-hour laboratory periods. *G. V. Skelton*

HE 412. Highway Engineering. Continuation of HE 411.

Required in Highway Engineering; senior year; second term; 3 credits; 2 recitations; 1 three-hour laboratory period.

G. V. Skelton

HE 413. Highway Engineering. Continuation of HE 411 and 412.

HYDRAULICS AND IRRIGATION ENGINEERING 245

Required in Highway Engineering; senior year; third term; 4 credits; 2 recitations; 2 three-hour laboratory periods.

G. V. Skelton

HE 416. Economics of Highway Construction. Economic and social advantages of improved roads; the traffic census; local and centralized systems of control; highway laws of different states; organization of construction and engineering forces; cost data; estimates; methods of handling work; forms of contract—lump sum, unit price, percentage, and cost plus fixed sum.

Required in Highway and in Military Engineering; senior year; first term; 3 credits; 3 three-hour laboratory periods.

G. V. Skelton

HE 417. Highway Transportation. A study of the various methods of highway transportation with especial reference to cost; the traffic census and its application; highway laws of different states; methods of financing highway construction; relation of character of traffic to type of construction, etc.

Elective; senior or graduate year; first term; 3 credits; 3 recitations.

G. V. Skelton

HE 427. Contracts and Specifications. A study of the general principles and laws of contracts as applied to engineering, including preparation and study of specifications and contracts based upon engineering structures designed by the individual student.

Required in Civil, Highway, Mechanical, and Military Engineering; senior year; second or third term; 3 credits; 3 recitations.

G. V. Skelton

HE 438. Municipal Engineering and City Planning. The modern city streets, boulevards, and transportation systems; drainage and sanitation; water supply; lighting. A course of lectures and assigned readings.

Required in Highway Engineering; senior year; third term; 3 credits; 3 recitations.

G. V. Skelton

HYDRAULICS AND IRRIGATION ENGINEERING

The work of this department is planned to give students a thorough training in the basic principles and field practices of those phases of engineering where the predominant problems are of a hydraulic nature. Courses are given which are considered essential in the various engineering major curricula.

Certain elective courses of an advanced nature are offered for those who desire to prepare themselves for specialization in fields

where a knowledge of the measurement, storage, conveyance, and utilization of water for municipal supply, irrigation, or power development is essential.

Equipment. The department is provided with excellent equipment for making field studies of a hydrological nature and for laboratory tests of orifices, weirs, pipe and hydraulic machinery.

The hydraulic laboratory occupies the middle third of two floors of the new Engineering Laboratory. It is equipped with storage tanks, adequate facilities for measuring the flow and pressure of water, and a variety of pumps and turbines.

The major equipment consists of two storage tanks of 1500-cubic-foot capacity, from which two 8-inch Pelton centrifugal pumps, so interconnected as to operate either in series or parallel, and driven by 40-horse-power motors, discharge water through a Venturi meter into a pressure tank. The flow from the pressure tank may be discharged either through a Pelton impulse water wheel developing about 30 horse-power and equipped with a prony brake for testing, or through a horizontal, single-discharge Pelton Francis turbine of the spiral encased type developing about 25 horse-power and equipped with a prony brake. The turbines discharge into one of two weir-tanks of approximately 750 cubic feet capacity, from which the flow passes to a distributing hopper that discharges into either of two large-capacity weighing tanks and thence returns to the storage tanks.

The minor equipment consists of a storage tank of 850-cubic-foot capacity, measuring tanks, pipe set-ups for determining losses, orifices, weirs, displacement and Venturi meters, manometers, hydraulic ram, several single- and triple-stage centrifugal pumps, several displacement pumps, 12-inch Doble laboratory water motor, and a vertical-shaft water wheel.

COURSES

Hyd 311. Hydrology. A study of precipitation, storage and run-off; field studies in standard methods of measurement.

Required in Civil and in Military Engineering; junior year; first term; 3 credits; 2 recitations; 3 periods field and laboratory work. Fee \$1.00. *H. S. Rogers, L. E. Brigham*

Hyd 312. Hydraulics. A study of the principles underlying pressure and flow of water; laboratory measurements of pressure and flow.

Prerequisite: Hyd 311. Required in Civil and in Military Engineering; junior year; second term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$3.00. *H. S. Rogers, L. E. Brigham*

HYDRAULICS AND IRRIGATION ENGINEERING 247

Hyd 313. **Hydraulics (Advanced)**. A continuation of Hyd 312. A study of the impulse and reaction of jets and energy of water.

Prerequisite: Hyd 312. Required in Civil and in Military Engineering; junior year; third term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.00. *H. S. Rogers, L. E. Brigham*

Hyd 321. **Hydraulics**. A study of the principles underlying and laboratory measurements of the pressure, flow, and energy of water.

Required in Electrical Engineering (junior year) and in Industrial Arts (senior year); second term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$3.00.

L. E. Brigham, C. A. Mockmore

Hyd 322. **Hydraulic Power Plants**. A study of the application of the principles of hydraulics to power production in hydro-electric plants; stream flow, dams, head works, pipe lines, wheels, and speed regulation.

Prerequisite: Hyd 321. Required in Electrical Engineering; junior year; third term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$3.00.

L. E. Brigham, C. A. Mockmore

Hyd 341. **Hydraulics**. A course similar to Hyd 321 for students in Mechanical Engineering.

Required in Mechanical Engineering; senior year; first term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$3.00.

L. E. Brigham

Hyd 342. **Hydraulic Machinery**. A study of the application of the principles of hydraulics to the design of pumps and turbines and the layout of pumping and power plants.

Prerequisite: Hyd 321 or 341. Required in Mechanical Engineering; senior year; second term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$3.00. *H. S. Rogers, L. E. Brigham*

Hyd 411. **Hydraulic Machinery**. Operation, characteristics, efficiency, theory, design, and installation of pumps and turbines; laboratory studies.

Prerequisite: Hyd 313. Required in Civil Engineering; senior year; first term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$3.00. *H. S. Rogers, C. A. Mockmore*

Hyd 412. **Hydraulic Construction**. Construction and selection of structures for the storage, conveyance, distribution, control, and measurements of water.

Prerequisites: Hyd 313, CE 483. Elective; senior year; third term; 4 credits; 2 recitations; 6 periods laboratory work. Fee \$1.00. *H. S. Rogers*

Hyd 413. **Reclamation Engineering.** Preliminary investigations and design of drainage and irrigation systems.

Prerequisite: Hyd 313. Required in Civil and in Military Engineering; senior year; third term; 3 credits; 2 recitations; 3 periods laboratory work. Fee \$1.00. *H. S. Rogers*

Hyd 451. **Water Power Engineering.** Development of water-power; storage and load factor; characteristics of modern turbines; selection of turbines; practical problems in design.

Prerequisite: Hyd 322, 342, or 411. Elective; senior or graduate year; second term; 3 credits; 1 recitation; 6 periods laboratory work. Fee \$1.00. *H. S. Rogers*

Hyd 452. **Water Supply and Sewerage.** A study of the quality of water and of works for its collection, purification, and distribution; a study of the amount of sewage and works for its removal and disposal; design problems.

Required in Military Engineering (senior year, first term); elective to others (any term); 5 credits. Fee \$1.00.

Hyd 460. **Hydraulic Laboratory.** A laboratory study of the pressure, flow, measurement, and pumping of water.

Elective; senior year; any term; 3 credits; 9 periods laboratory work. Fee \$3.00.

Hyd 461. **Hydraulics.** Practical application of the principles of hydraulics to irrigation farming, especially for Agriculture students; pressure in tanks and pipes; measurement of water by weirs, orifices, and current meters; losses of head in pipes; design of open channels; seepage losses; operation of pumps and other lifting devices.

Elective; senior year; second term; 3 credits; 2 lectures; 3 periods laboratory work. Fee \$3.00.

Hyd 463. **Irrigation Operation.** Operation and maintenance of irrigation systems; protection of canals; maintenance of structures; delivery of water; organization; financial phases of operation.

Prerequisite: Hyd 462. Elective in Civil Engineering and in Soils; senior year; third term; 3 credits; 3 recitations.

INDUSTRIAL ARTS

There is a steadily increasing demand for competent, trained teachers of the Industrial Arts subjects in elementary, secondary, and vocational schools of Oregon and other states. The manual instruction for boys and girls below the seventh grade is generally given by the regular grade teachers, but the supervisor or special

teacher of manual training should be able to organize this work and correlate it with other school subjects and with the later formal courses in manual arts. For boys, this work will take the form of instruction in woodworking, blacksmithing, automobile repairing, cement work, and vocational work in the various trades. Where the work is highly specialized along some trade line it is partly financed by the Federal Government.

A degree curriculum of the same general standard as the other baccalaureate curricula is provided in order that the young man who specializes in this field may receive preparation that will place him upon a par with high-school teachers of other branches. The Industrial Arts department is a part of the School of Engineering and has under its supervision all the shop courses offered in the other departments of the College.

Equipment. This department provides the necessary equipment for carrying on the different lines of shop work.

The Wood Shop, supplied with the best machines and tools the market affords, contains twenty-four double benches of modern design, accommodating forty-eight students. Each bench is provided with patent rapid-action vises for holding the work, and is furnished with two sets of hand tools, consisting of rip-saws, cut-off saws and backsaws, planes, chisels, marking gauges, try-squares, hammers, dividers, and oilstones. The machine equipment of this shop consists of fifteen wood-turning lathes, each furnished with a set of tools; one iron saw-table with rip and cut-off saws, one hand-saw, one jig-saw, 24-inch surface planer, 16-inch glue joiner, one hollow chisel mortiser, one belt sander, one tenoner, one veneering press, one disc sander built by the students, and an exhaust system to carry off sawdust. There are also two glue tables with clamps of various sizes, two electric glue heaters. The power is furnished by three three-phase induction motors of 15, 7½, and 5 horse-power, respectively.

The Forge Shop contains forty-two down draft forges of the most approved pattern. Blast is furnished by a steel pressure blower driven by a 10-horse-power induction motor, and the smoke and gases are removed by an 80-inch exhaust fan, driven by a 20-horse-power motor. Each forge is provided with an anvil, hammers, hardies, tongs, and other small tools. An emery grinder, built by students, has been added to the equipment. There are also swedge blocks and vises at convenient points in the room for general use. A power hammer and a furnace for the heat treatment of metals have recently been added.

The Machine Shop contains one 24x24-inch iron planer, one 15-inch shaper, one 12-inch shaper, one universal milling machine,

one universal tool grinder, one wet tool grinder, one radial drill, one 20-inch drill press, one sensitive drill press; one 20-inch engine lathe, one 16-inch engine lathe, one 16-inch universal turret lathe, one 14-inch modern geared lathe, five 14-inch engine lathes, two 10-inch speed lathes, one shop saw, one automatic knife grinder, and twelve bench vises. The following new machines have recently been added: one universal milling machine; one 16-inch by 10-foot quick-change gear lathe; one 14-inch by 8-foot quick change lathe; one 11-inch by 5-foot engine lathe; one 14-inch by 10-foot quick-change gear lathe; one 14-inch by 8-foot high duty quick-change gear lathe; one universal cutter and tool grinder; one 1-ton, low bed crane; and one electric drill. A 20-horse-power induction motor furnishes the power. A tool-room adjacent contains the small tools. These tools are given out to the students on the check plan.

The Foundry contains a 22-inch Colliau cupola having a capacity of two tons per hour, one 1,200-pound crane ladle, one 800-pound crane ladle, bull ladles, and hand ladles, one 16-inch brass furnace, brass molder's tub, crucibles, one large core-oven, one portable core-oven, one two-ton jib crane, one wall crane for charging floor, one air compressor, one Delano pulley molding machine No. 2, besides shovels, rammers, and small tools to accommodate twenty students at one time. An emery grinder, built by the students, has been added.

The Automobile Mechanics Shop, occupying the basement of the Engineering Laboratory, is equipped with all the standard tools usually found in a modern commercial garage. Among the tools are speed wrenches, special wrenches, standard reamers, taps and dies, valve-seating tools, electric drill, jacks, and pliers. The general equipment includes two portable cranes, a twin jack, motor generator set, vulcanizing outfit, 5-horse-power motor, line shafting, emery grinder, drill press, one 15-inch by 8-foot engine lathe, one Marvel cylinder boring machine, one engine stand, and battery repairing tools. A Ford car and a Maxwell truck, used in towing cars and for general utility purposes, together with various parts of cars for instructional purposes, are also elements of the automobile mechanics equipment.

COURSES

IA 111. Cabinet Making. Designed to meet the needs of those students who desire to teach manual training in the sixth, seventh, eighth, and ninth grades of the public schools. A course in wood construction and design; theory and practice in the proper use of tools; growth and structure of woods; shrinkage, warpage, and

seasoning of timber; staining and finishing; study of shop methods, equipment, and courses of study.

Required in Industrial Arts; freshman year; first term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *H. C. Brandon*

IA 112. Cabinet Making. Continuation of IA 111. Problems requiring more technical skill and more knowledge of design and tool processes are taken up.

Required in Industrial Arts; freshman year; second term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *H. C. Brandon*

IA 113. Cabinet Making. Intended to familiarize those students who wish to teach manual training in the high school with commercial methods in wood-working such as are used in the average jobbing shop and with such machinery as is found in the better equipped high school. Well-designed pieces of furniture are made and finished.

Prerequisites: IA 111, 112. Required in Industrial Arts; freshman year; third term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *H. C. Brandon*

IA 114. Cabinet Work. Designing and construction of furniture according to the ability of the individual student; mixing of stains, fillers, and various finishes, with their application; study of the design and construction of drawers and panel work; primary upholstery.

Elective; any term; 2 credits; 2 laboratory periods. Fee \$4.00. Deposit \$1.00. *D. G. Thayer*

IA 115. Cabinet Work. A continuation of IA 114.

Elective; any term; 2 credits; 2 three-hour laboratory periods.

IA 116. Cabinet Work. A continuation of IA 114.

Elective; any term; 3 credits; 3 three-hour laboratory periods.

IA 181. Automobile Mechanics. Intended for owners and drivers of cars, emphasizing adjustments, maintenance, and ordinary running repairs of the various parts and units of the automobile; lubrication; cleaning; care of batteries and electrical systems; various types of construction as employed in machines of different manufactures; actual inspection of different types of cars afforded by cars that are being overhauled in the shop.

Elective; any year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. *M. L. Granning*

IA 182. Automobile Mechanics, Elementary. The object of this course is to afford the student a systematic introduction to

automobile mechanics by means of a detailed survey of the vital parts and their function. It includes practical work involving the assembling and disassembling of parts, testing for and locating troubles; making replacements and repairs. There are lectures, demonstrations, and class discussions. A modern text is used.

Required in Industrial Arts; senior year; second term; 3 credits; 1 lecture; 2 three-hour shop periods. Fee \$4.00.

M. L. Granning

IA 183. Automobile Mechanics. Continuation of IA 182. This course involves a study of carburetors, ignition, starting and lighting systems, the more complex adjustments and repairs, to the extent that time will permit. Lectures, demonstrations, and class discussions. A modern text is used.

Prerequisite: IA 182 or equivalent experience. Required in Industrial Arts; senior year; third term; 3 credits; 1 lecture; 2 three-hour shop periods. Fee \$4.00.

IA 184. Automobile Mechanics. A continuation of IA 183. Intended for students in Industrial Arts who desire to prepare themselves as teachers of automobile mechanics in high schools.

Elective; any term; 3 credits; 3 three-hour laboratory periods.

IA 191, 192, 193. Shop Drawing. For those students who plan to teach manual training. The elements of drawing; use of drawing instruments; lettering; general construction; methods of representation; free-hand sketching; considerable attention to drawings of pieces of furniture and constructions in wood that may be worked out in the shop. In the third term the problem of furniture design receives considerable attention.

Required in Industrial Arts; freshman year; three terms; 2 credits each term; 2 three-hour laboratory periods. Fee \$0.50 each term.

H. C. Brandon

IA 212. Patternmaking. The student is given a broad view of modern pattern-shop practice, emphasis being placed upon the relation of patternmaking to drafting, design, foundry work, and machine-shop operations. Lectures, demonstrations, and practical work on patterns, involving typical methods of construction.

Required in Mechanical Engineering (junior year) and Electrical Engineering (sophomore year); any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *D. G. Thayer*

IA 213. Patternmaking. Course more thorough than IA 212, emphasis being placed upon the methods of teaching patternmaking.

Required in Industrial Arts; sophomore year; first term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *D. G. Thayer*

IA 214. **Patternmaking.** A continuation of IA 212.

Elective; any term; 3 credits; 3 three-hour laboratory periods.

IA 222. **Carpentry.** Involves discussion of foundations and forms, practices in framing, applications of the steel square, exterior and interior finish, estimates of quantities of materials and costs.

Required in Industrial Arts; sophomore year; third term; 3 credits; 3 three-hour shop periods. Fee \$6.00. Deposit \$1.00.

IA 223. **Mill Work—Machine Wood Working.** Emphasis is laid upon the care and adjustment of wood working machinery of the average instructional shop; upon the setting up of the machines; upon the laying out and construction of gigs to secure uniformity and accuracy of results, combined with rapidity of production. Practical application of these appliances is obtained by routing a number of duplicate pieces through the shop.

Required in Industrial Arts; sophomore year; second term; 3 credits; 3 three-hour shop periods. Fee \$6.00. Deposit \$1.00.

D. G. Thayer

IA 232. **Patternmaking.** Offered to students having two-credit courses in patternmaking or equivalent. Construction of the more complicated patterns and core boxes necessary for the building of steam and gas engines or other machine parts.

Elective; first or second term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00.

D. G. Thayer

IA 241. **Foundry Practice.** Includes a study of foundry equipment; care and management of cupolas; mixing and melting of iron; molding in green and dry sand; preparation of cores; casting in iron and brass.

Required in Mechanical Engineering; sophomore year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00.

A. E. Ridenour

IA 242. **Foundry Practice.** More comprehensive than IA 241.

Required in Industrial Arts; junior year; first term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00.

A. E. Ridenour

IA 251. **Blacksmithing.** The student is taught to make and manage a forge fire; to shape iron by bending, upsetting, drawing, and welding. Many useful articles are made, including hooks, staples, rings, clevises, and chains.

Required in Mechanical and Electrical Engineering; sophomore year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00.

W. H. Horning

IA 252. **Advanced Blacksmithing.** Continuation of IA 251 or equivalent for those who wish to take another term of blacksmithing.

Elective; sophomore year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. *W. H. Horning*

IA 253. **Forging and Tool Dressing.** After a minimum amount of preliminary work in forging iron the remainder of the term is devoted to making, tempering, and dressing chisels, drills, and other tools.

Elective in Mining Engineering and Chemical Engineering; sophomore year; third term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. *W. H. Horning*

IA 254. **Tool Making and Tempering.** Devoted to the study of the heat treatment of steel as exemplified in the making and tempering of springs, machine tools, and other articles of steel.

Prerequisite: IA 252 or equivalent. Required in Industrial Arts; sophomore year; first or third term; 1 credit; 1 three-hour laboratory period. Fee \$2.00. *W. H. Horning*

IA 262. **Machine Shop.** Both bench and machine work involving principles of chipping, filing, and hand finishing; exercises on lathe, shaper, planer, drill press, and milling machine; lectures on the proper uses of machine tools; cutting speeds; and labor- and time-saving methods.

Required in Mechanical and Electrical Engineering; sophomore year; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00.

IA 263. **Machine Shop.** Continuation of IA 262. Considerable time is given to labor-saving devices in rapid production work.

Required in Mechanical Engineering (junior year, second term), and in Electrical Engineering (sophomore year, first term); 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *G. H. Hill*

IA 264. **Machine Shop.** A continuation of IA 263.

Elective; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00.

IA 333. **Wood Turning.** A series of exercises in wood turning intended to familiarize the student with the various uses of lathe tools; methods of centering and chucking; segment work; staining and polishing. Small pieces of furniture such as vases, bowls, rings, trays, tables, and stools are worked out.

Required in Industrial Arts; elective to others; junior year; second term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00. Deposit \$1.00. *H. C. Brandon*

IA 342. **Advanced Foundry Practice.** Elective; any term; 2 credits; 2 three-hour laboratory periods. Fee \$4.00.

A. E. Ridenour

IA 351. **Forging.** Deals with the equipment of the blacksmith shop; exercises in bending, shaping, upsetting, and welding iron; instruction in hardening and tempering steel; brazing; lectures on the management of a shop, instruction, and shop equipment.

Required in Industrial Arts; junior year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$6.00.

IA 352. **Hammered Metal Work.** Consists of hand-wrought metal work, including hard and soft soldering; the formation of bowls, trays, boxes, lamp shades; and design and construction of furniture fittings.

Required in Industrial Arts; junior year; second term; 3 credits; 3 three-hour laboratory periods. Fee \$6.00. *H. C. Brandon*

IA 363. **Machine Shop.** Includes both bench and machine work, taught by a series of exercises in chipping, filing, and finishing; machine work on lathe, shaper, planer, drill press, and milling machine.

Elective in Logging Engineering; junior year; third term; 3 credits; 3 three-hour laboratory periods. Fee \$6.00. Deposit \$1.00.

G. H. Hill

IA 461. **Machine Shop.** Hand processes of chipping, filing and polishing; practical work on the lathe, drill press, planer, and shaper, taught by carefully planned exercises; lectures on the proper use of tools; selection, care, and use of machine tools; methods of instruction.

Required in Industrial Arts; senior year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$6.00. Deposit \$1.00.

G. H. Hill

IA 462. **Machine Shop.** Continuation of IA 461, in which the student becomes familiar with the milling machine, and general machine shop practice. Considerable attention is given to factory methods, and to processes of rapid production.

Required in Industrial Arts; senior year; second term; 3 credits; 3 three-hour laboratory periods. Fee \$6.00. Deposit \$1.00.

G. H. Hill

IA 493. **Advanced Mechanical Drawing.** A course in elementary machine design dealing with the design of simple installa-

tions and parts of machinery by means of standard handbooks and empirical formulas.

Required in Industrial Arts; senior year; second term; 3 credits; 3 laboratory periods.

H. C. Brandon

MECHANICAL ENGINEERING

The curriculum in Mechanical Engineering aims to prepare young men for useful and responsible positions in the industrial life of the country. The scientific principles involved in machines, mechanical movements, and machine design are investigated and studied by solving numerous problems in classroom and laboratory. The study of transformation of heat energy into power is taken up in early courses, where the student becomes familiar with the various types of engines by actual contact in the laboratory. At the same time the physical laws governing the principles of operation of all types of heat engines and transformation of heat energy are explained in the lectures and illustrated by problems.

The foremost thought in planning the courses has been that since the field for service is very broad, a young man should have liberal training along general engineering and business lines, in order that he may profitably pursue any one of the many lines of activity covered by men in his profession. The curriculum in Mechanical Engineering, therefore, in addition to the major courses in Steam and Gas Machinery, Machine Design, and Shop Work, includes courses in Hydraulic Machinery, Electricity, Wood and Steel Structures, Reinforced Concrete Design, Economics, Accounting, and Public Speaking.

The usual courses in Mathematics, English, Physics, and Chemistry are given in the early part of the course. The applied engineering courses come during the senior year, at which time the economic and commercial aspects of engineering problems are stressed.

Minor in Education. Students registered in Mechanical Engineering who do not take military work during the junior and senior years, can arrange to take work in Education and satisfy the requirements for teaching in public schools.

Military Science and Tactics. Arrangements have been made with the Military department whereby students graduating in Mechanical Engineering may also receive their degree in Military Science and Tactics upon the completion of an additional year's work.

Equipment. The department has three large, well lighted drafting rooms, equipped with necessary drawing desks, boards, lockers, etc.

The gas-engine laboratory contains some twenty engines, including examples of practically every type in use. A number of these are gasoline and kerosene four- and two-cycle engines, ranging in size from three to eighteen horse-power. Many of these engines are intended for practice in operation, repair work, and general maintenance; but all of the principal units are especially fitted for testing and experimentation.

The steam laboratory contains several steam boilers of different types, plain slide-valve, high-speed automatic and Corliss engines, and steam turbines; also pumps, injectors, fans, hot blast heating system, and other auxiliary equipment. The laboratory courses teach the operation, care, and maintenance of power-plant equipment, as well as testing, power measurement, and economy.

The shop equipment used by engineering students is under the supervision of the department of Industrial Arts and includes machines and tools usually found in modern college shops.

COURSES

ME 101. Engineering Problems. A course of lectures and problems, dealing in an elementary way with the general field of engineering. The purpose of the course is to broaden the student's knowledge of the kind of problems encountered in the various branches of engineering as a means of helping him decide whether he wishes to follow engineering work and if so what branch of work he prefers.

Required in Civil, Electrical, and Mechanical Engineering; freshman year; any term; 2 credits; 1 lecture; 1 three-hour problem period. Fee \$0.50.

ME 111. Linear Drawing and Lettering. Training in the use of drafting instruments to construct accurate pencil drawings and clean-cut ink lines; practice in making well-shaped engineering lettering and titles. Intended for students who have had no training in mechanical drawing. A student who, by submitting certified work in linear drawing and lettering, or by taking a special examination, satisfies the instructor that he has had the equivalent of this course may be excused from this work. The instruments and materials for the course cost about \$20.00; the instruments are used in all later drawing courses.

Required in Civil, Electrical, Mechanical, and Mining Engineering (freshman year) and in Forestry (sophomore year); any term; 2 credits; 3 two-hour laboratory periods. Fee \$0.50.

M. Wenk, E. C. Willey

ME 112. Elementary Mechanical Drawing. Practice in making working drawings of machine parts; methods of dimensioning and checking; making tracings from these drawings; free-hand sketching; pictorial representation.

Prerequisite: ME 111 or equivalent. Required in Civil, Electrical, Mechanical, and Mining Engineering (freshman year), and in Industrial Arts (junior year); any term; 2 credits; 3 two-hour laboratory periods. Fee \$0.50.

M. Wenk, E. C. Willey

ME 113. Descriptive Geometry. Theory and problems on the projection of points, lines, surfaces, and solids. Effort is made to make the work as practical as possible and to reveal its relation to mechanical drawing and drafting-room problems.

Required in Industrial Arts; junior year; third term; 3 credits; 2 three-hour laboratory periods; 1 lecture.

M. Wenk

ME 114. Mechanical Drawing. A continuation of ME 112.

Required in Industrial Arts (junior year) and in Civil, Electrical, and Mechanical Engineering (freshman year); any term; 2 credits; 3 two-hour laboratory periods. Fee \$0.50.

M. Wenk, E. C. Willey

ME 211. Descriptive Geometry. Theory and problems on the projection of points, lines, surfaces, and solids. An effort is made to make the work as practical as possible and to reveal to the student its relation to mechanical drawing and drafting-room problems.

Required in Mechanical and Military Engineering; sophomore year; first term; 2 credits; 2 three-hour laboratory periods. Fee \$0.50.

M. C. Phillips

ME 212. Advanced Mechanical Drawing. A course following Descriptive Geometry and Elementary Mechanical Drawing, in which the principles of the foregoing are applied to the production of complete shop drawings.

Required in Mechanical Engineering; sophomore year; second term; 2 credits; 2 three-hour laboratory periods. Fee \$0.50.

M. C. Phillips

ME 213. Mechanism. A study of mechanical movements, including velocity ratios, transmission of motion by link work, gearing, cams, and belting.

Required in Mechanical Engineering; sophomore year; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$0.50.

M. C. Phillips

ME 221. Elements of Heat Engineering. An introductory course in the fundamental principles of heat engineering, including

study of fuels and combustion, properties of steam, steam boilers; practical laboratory work in general construction, operation, and maintenance of boiler-room equipment.

Required in Mechanical Engineering; sophomore year; first term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$3.00. *A. W. Bechlem*

ME 222. Steam Engines. A study of construction and operation of engines and function of engine parts; use of the indicator and prony brake; engine valve gears; practice in adjustment and operation of steam engines.

Required in Mechanical Engineering; sophomore year; second term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$3.00. *A. W. Bechlem*

ME 223. Gas Engines. Gas engine fuels; their combustion; construction of the various types of engines; carburetors and ignition systems; practice in the operation of gas engines; their adjustment; diagnosis and correction of engine troubles.

Required in Mechanical Engineering; sophomore year; third term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$1.50. *A. W. Bechlem*

ME 232. Steam and Gas Machinery (Theory). A general course adapted to the needs of Civil Engineering students. Elementary thermodynamics; properties of steam; fuels and combustion; boilers; engines; pumps and other auxiliaries; gas and oil engines.

Required in Chemical Engineering (senior year, first term) and in Civil Engineering (sophomore year, second term); 3 credits; 2 recitations; 1 three-hour computation period. *R. B. Boals*

ME 233. Steam and Gas Machinery (Laboratory Practice). A course in the operation and testing of steam engines; boilers; turbines; gas engines; pumps, etc. Simple tests are made to determine the efficiency and operating characteristics of such machines.

Required in Civil Engineering (sophomore year, third term), and in Chemical Engineering (senior year, second term); 2 credits; 1 three-hour laboratory period. Fee \$5.00. *A. W. Bechlem*

ME 321. Heat Engineering. Thermodynamics of gases and vapors, properties of steam, Rankine cycle for steam engine and steam turbine, refrigeration cycle, properties of gases, pressure volume changes, mixtures, humidity, air compressor cycle, Otto and Diesel cycles.

Prerequisites: Mth 353, Ph 223. Required in Mechanical Engineering; junior year; first term; 3 credits; 2 recitations; 1 three-hour problem period.

W. H. Martin

ME 322. Heat Engineering. Continuation of ME 321.

Required in Mechanical Engineering; junior year; second term; 3 credits; 3 recitations.

W. H. Martin

ME 323. Steam Turbines. The theory of the steam turbine; types; construction and design of most important parts; operating characteristics; effect of pressure, superheat, vacuum, and other factors.

Prerequisite: ME 321. Optional in Mechanical Engineering; senior year; third term; 3 credits; 3 recitations.

W. H. Martin

ME 331. Heat Power Engineering. An elementary study of the theory of steam, gas, and air machinery; properties of gases, wet, dry, and superheated steam; pressure, volume, and temperature relations of gases and vapors.

Prerequisites: Mth 253, Ph 223. Required in Electrical Engineering; junior year; first term; 3 credits; 2 recitations; 1 three-hour computation period. Fee \$0.50.

R. B. Boals

ME 332. Heat Power Engineering. Continuation of ME 331. Analysis of engine and turbine cycles; comparison of theoretical and actual machines; different types of prime movers and their characteristics; power, efficiency, and performance; valve gears; governing systems.

Required in Electrical Engineering; junior year; second term; 3 credits; 2 recitations; 1 three-hour computation period. Fee \$0.50.

R. B. Boals

ME 333. Heat Power Engineering. Continuation of ME 332. A study of the properties of fuels; combustion; furnace design for different fuels; types and characteristics of boilers; condensers; pumps; feed water heaters; gas and oil engines and producers; selection and arrangement of equipment for a power plant. Laboratory practice in operation and testing power plant equipment.

Required in Electrical Engineering; junior year; third term; 3 credits; 1 recitation; 1 three-hour laboratory period. Fee \$3.00.

R. B. Boals

ME 352, 353. Mechanical Engineering Laboratory. A detailed study of the instruments and apparatus required for testing steam, gas, and air machinery; including the calibration and correction of pressure and vacuum gages; indicators; planimeters; draft gages; air measurement; steam calorimeters, valve setting; and elementary tests of various engines for economy and mechanical efficiency.

Prerequisite: ME 321. Required in Mechanical Engineering; junior year; second and third terms; 2 credits each term; 1 three-hour laboratory period. Fee \$3.00 each term. *R. B. Boals*

ME 363. **Dairy Refrigeration.** An elementary course in the principles and practice of refrigeration as applied to the dairy industry.

Elective in Dairy Husbandry; junior or senior year; third term; 2 credits. *W. H. Martin*

ME 411. **Machine Design.** Application of the principles of Mechanism, Mechanics, and Strength of Materials to design of machine elements. Problems involving riveted joints; screws; shafts and shafting; belt and rope drive; pulleys; gearing; bearings; machine frames; analysis of force and energy problems; flywheels; engine balancing; computations and drawings necessary to the design of one or more complete machines.

Prerequisite: MM 353. Required in Mechanical Engineering; senior year; first term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$0.50. *J. R. DuPriest, A. C. Coonradt*

ME 412. **Machine Design.** Continuation of ME 411.

Required in Mechanical Engineering; senior year; second term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$0.50. *J. R. DuPriest, A. C. Coonradt*

ME 413. **Machine Design.** Continuation of ME 412.

Required in Mechanical Engineering; senior year; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$0.50. *J. R. DuPriest, A. C. Coonradt*

ME 421. **Gas Engineering.** Theory of gas and oil engines and gas producers; the Otto and Diesel cycles; liquid fuels; principles of carburetion; ignition and flame propagation; gas manufacture; design characteristics of stationary and automotive engines; trend of development.

Prerequisite: ME 322. Optional in Mechanical Engineering; senior year; third term; 3 credits; 2 recitations; 1 three-hour computation period. *J. R. DuPriest*

ME 432, 433. **Power Plant Engineering.** A detailed study of the principles involved and the construction and operation of power plant equipment; engines; turbines; boilers; condensers; heaters; water and vacuum pumps; stokers; furnaces and combustion of fuels. Attention is given to the proper location of plant, selection of equipment for given conditions, and methods of determining fixed charges and operating cost.

Prerequisite: ME 322. Required in Mechanical Engineering; senior year; first and second terms; 3 credits each term; 3 recitations.

J. R. DuPriest

ME 442. Power Plant Design. A study of the problems involved in the design of valve gears and governing systems, of steam and gas prime movers; sizes of cylinders for engines; fly wheel design, etc.

Required in Mechanical Engineering (junior year, first term, or senior year, second term); 2 credits; 2 three-hour periods. Fee \$1.00.

J. R. DuPriest, A. C. Coonradt

ME 443. Power Plant Design. A course in the quantitative side of design of power plant equipment. Problems to determine the dimensions of boilers, such as heating surface, gate surface, diameter and thickness of shell, number of tubes, etc.; diameter, height, and stability of chimneys; sizes of condensers and pumps; construction of load curves; plant layout, etc. Must accompany or follow ME 433.

Required in Mechanical Engineering; senior year; third term; 2 credits; 2 three-hour periods. Fee \$1.00.

J. R. DuPriest, A. C. Coonradt

ME 451, 452, 453. Engineering Laboratory. A detailed study of mechanical equipment and processes by the method of laboratory tests and analysis of test results. Efficiency and economy tests and operating characteristics of steam, gas, and oil engines; steam turbines; steam pumps; boilers; fans and blowers; heating and ventilating equipment; compressed air and refrigerating machinery. The A. S. M. E. Power Test Code is used as a laboratory manual.

Required in Mechanical Engineering; senior year; three terms; 2 credits each term; 4 periods laboratory work. Fee \$5.00 each term.

W. H. Martin, A. W. Bechlem

ME 461. Heating and Ventilating. Study of modern methods of heating and ventilating; approved systems of heating by means of air, steam, and hot water; methods of computing radiating surface; effective methods of ventilation; general design; construction and operation of heating plant.

Required in Mechanical Engineering; senior year; first term; 3 credits; 1 recitation; 2 three-hour laboratory periods.

M. C. Phillips

ME 481, 482, 483. Mechanical Engineering Seminar. Practice in effective writing and speaking on engineering and allied subjects. Preference is given to the discussion of new developments in the field of mechanical engineering. The work supplements the work of the prescribed courses.

Required in Mechanical Engineering; senior year; three terms; 1 credit. Fee \$0.50 each term. *J. R. DuPriest*

ME 621, 622, 623. Thesis and Graduate Study. Each student is assigned a special problem, such as production and distribution of compressed air; valve gears and governing systems for prime movers; balancing of machinery; analysis of experimental data and developing equations to fit curves; power production costs; estimating and production costs, etc. Detailed written reports are required.

Prerequisites: To be approved in each case. Elective; senior or graduate year; three terms; 3 credits each term; hours to be arranged.

MECHANICS AND MATERIALS

Courses are offered covering statics, dynamics, and the strength and properties of engineering materials. In the last division there are, in addition to the general courses which deal with structural materials, several special courses from which the student may learn the technic belonging to various specialized branches of materials treatment and testing.

The offices, classrooms, and laboratories of the department are located in the east division of the Engineering Laboratory. The floor-space occupied is about 14,000 square feet, and provides separate laboratories for structural materials, cement and concrete, bituminous and non-bituminous highway materials, oils, fuels, and the microscopic examination and heat treatment of metals. The equipment is modern, and is well arranged for the work of instruction and for a limited amount of research.

MM 311. Materials of Engineering. A lecture and laboratory course on the materials of engineering construction with special reference to the methods and specifications adopted by the American Society for Testing Materials and other national engineering organizations. The laboratory program is varied somewhat for the students from different departments to include tests on those materials of special interest to them; for example, Civil Engineering students do special work on highway materials, Forestry students on timber, etc.

Required in Civil and in Logging Engineering (junior year, second term), in Electrical Engineering (junior year, first term), in Mechanical Engineering (junior year, third term), in Chemical Engineering and in Industrial Arts (senior year, first term); elective to other suitably prepared students; 3 credits; 1 lecture; 3 periods laboratory work. Fee \$3.00.

S. H. Graf, C. E. Thomas, I. F. Waterman, J. C. Othus

MM 351. Mechanics (Statics). Applied mechanics for engineering students; forces and force systems with reference to the equilibrium of rigid bodies, including simple framed structures; methods of finding centers of gravity and moments of inertia and their practical applications; numerous problems having engineering application.

Prerequisites: Differential and Integral Calculus. Required in Civil, Electrical, Mechanical, Military, and Mining Engineering; junior year; first term; 3 credits; 1 recitation; 2 two-hour computing periods. *S. H. Graf, C. E. Thomas, I. F. Waterman, J. C. Othus*

MM 352. Mechanics (Dynamics). A continuation of MM 351 dealing with principles and problems in Kinetics; force as a factor causing motion; work, energy, friction, and impact studied and illustrated by means of numerous problems.

Prerequisite: MM 351. Required in Electrical, Military, and Mining Engineering (second term) and in Civil and Mechanical Engineering (third term); junior year; 3 credits; 1 recitation; 2 two-hour computing periods.

S. H. Graf, C. E. Thomas, I. F. Waterman, J. C. Othus

MM 353. Strength of Materials. In this course the general principles of mechanics are applied to the elements of engineering structures to determine their strength and fitness. Some of the features are tensile and crushing strength of various engineering materials; stresses in beams and girders under different systems of loading and support; supporting strength of columns; application of torsion to shafts in transmission of power. Students are required to work and hand in problems.

Prerequisite: MM 352. Required in Electrical and Military Engineering (third term) and in Civil and Mechanical Engineering (second term); junior year; 3 credits; 1 recitation; 2 two-hour computing periods.

S. H. Graf, C. E. Thomas, I. F. Waterman, J. C. Othus

MM 426. Highway Materials Laboratory. Designed particularly for those specializing in Highway Engineering. Different road and paving materials and binders are tested and their relative values determined. Sheet asphalt mixtures and bituminous mortars are studied to determine the effects of various changes in the grading of the aggregates. Finally, samples of various types of roads and pavements are analyzed for density, composition, and grading, with special reference to their conformity with specifications. Assigned references.

Required in Highway Engineering; senior year; first term; 3 credits; 1 lecture; 2 laboratory periods. Fee \$3.00.

S. H. Graf, I. F. Waterman

MM 427. Structural Laboratory. An advanced laboratory course on plain and reinforced beams and columns to study methods of reinforcing. Stress distribution under unsymmetrical loads. Thermal conductivity of concrete. Study of stresses in structures by strain gage.

Prerequisite: MM 311. Elective in Civil Engineering; senior year; second term; 3 credits; 1 lecture; 1 four-hour laboratory period. Fee \$4.00.
S. H. Graf, I. F. Waterman

MM 441. Fuels and Lubricants. A lecture and laboratory course covering the properties and industrial uses and testing of fuels, and of materials such as oils, bearing metals, belting, etc., used in power transmission. Designed particularly as an elective course for Mechanical and Electrical Engineering students.

Elective; junior or senior year; first or third term; 3 credits; 1 lecture; 1 four-hour laboratory period. Assigned readings and reports. Fee \$3.00.
S. H. Graf, C. E. Thomas

MM 481. Metallography and Pyrometry. Lectures and laboratory work designed to give a working knowledge of the methods of study of structure of metals and alloys; particular attention given to correlation of thermal and mechanical treatment with structure and physical properties of iron and steel; calibration and use of various types of pyrometers; laboratory experiments in heat treatment; preparation of specimens; etching; studying structure under the microscope; making photomicrographs; physical tests, whenever possible, to show the effects on strength, ductility, hardness, or other mechanical properties of the different thermal treatments or other industrial processes.

Required in Chemical Engineering; senior year; second term; 3 credits; 1 lecture; 1 four-hour laboratory period. Fee \$4.00.

S. H. Graf, C. E. Thomas

MM 691, 692, 693. Thesis and Graduate Study. An opportunity is given for suitably prepared students interested in research to work out original problems. These may be either of their own choosing or suggested by the department, and may cover any subject within the scope of the department laboratories.

Prerequisites: Must be approved in each case, and will vary according to the work proposed. Elective to senior and graduate students; three terms; 3 credits each term; 9 hours laboratory work. Fee \$3.00.
S. H. Graf, C. E. Thomas, I. F. Waterman

School of Forestry

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
GEORGE WILCOX PEAVY, M.S.F., Dean of the School of Forestry.
DOROTHY MAE METSKER, Secretary to the Dean.

General Forestry

THURMAN JAMES STARKER, M.S.F., Professor of Forestry.
EARL GEORGE MASON, M.F., Assistant Professor of Forestry.

Logging Engineering

HENRY RICHARD PATTERSON, B.S., Professor of Logging Engineering.
EDWIN LOUIS MOWAT, B.S., Instructor in Logging Engineering.

The State of Oregon has a very material interest in its forest properties. There is within its limits twenty percent of the remaining standing timber in the United States. In lumber production Oregon stands second among the states. Timber products having a value in excess of one hundred million dollars annually are manufactured within the state. In the lumber industry in Oregon 43,000 men find employment; this total represents 65 percent of the industrial payroll of the state. Every economic consideration points toward a rapid expansion of this industry in the near future. Climatic conditions in Oregon are exceptionally well suited to tree growth. Because of the rough topography in the greater portion of the forested region little of the land, when cleared, is suited to agriculture. It is bad economic policy to permit this logged-off land to remain unproductive. It should be producing another crop of trees. The State of Oregon is vitally interested in seeing to it that the present crop of timber is fully utilized when harvested and that all the land within the state which is non-agricultural in character and which is adapted to tree growth should be kept busy producing another crop of timber.

The function of the School of Forestry is to serve the state by training men to assist in perpetuating the state's greatest single industry, to serve the nation by preparing men to be of use in helping to formulate and make effective a national forestry program which will insure forest products adequate in amount to meet the reasonable needs of our people for all time to come, and to serve the great lumber industry of the state by giving men the necessary technical foundation to be of use in logging and in

manufacturing into timber products the vast store of uncut forest material. Oregon has in private and public ownership 23,000,000 acres of forest land. Timbered areas are being cut over at the rate of 100,000 acres annually. With the exhaustion of eastern timber supplies and with the rapid utilization of the southern pine forests, the responsibility of supplying the nation's timber needs is being placed upon the Pacific Northwest in a greater and greater degree. There is a real service for the forester and the logging engineer to perform in Oregon. The business of the School of Forestry is to prepare these men to perform this service well.

Technical Forestry. Within the past decade the American forester has won notable recognition, and the profession of forestry has made a wonderful growth. The Federal Government has set aside one hundred and fifty-six million acres of forest land to be permanently devoted to growing timber. In Oregon an area of thirteen million acres lies within the National Forests, while an area of ten million acres is privately owned. Since it is suited only to growing timber, much of the privately owned land will eventually be brought under some form of management so that it can be made permanently productive. This indicates the field of the technical forester. His business is to see to it that this vast area both in Federal and in private ownership is brought to its highest degree of productiveness and kept there.

Logging Engineering. The logging engineer is a recent development of the Pacific Northwest. In the past, low prices for standing timber, easy logging, and the high prices for lumber have made profits to the lumberman sure, and these same conditions have not demanded economy in operation. With high-priced stumpage, timber difficult of access, and low prices for lumber, a revolution in the entire lumber industry is being forced. It has become a case of economy in operation or financial failure. Bringing the logs over rough country to the mill involves many engineering problems. Among these are the construction of logging railroads, the installation of efficient sky-line and ground logging devices, and the operation of special steam and electrical logging equipment. The curriculum in Logging Engineering is designed to equip young men to be of use in this field. The curriculum as outlined in this catalogue was prepared under the direction of able timbermen experienced in the Pacific Northwest, and the strictly technical subjects in the curriculum are taught by men who have had practical experience in some of the most progressive logging operations in the country.

Lumber Manufacture. The manufacture and merchandising of lumber have come to be matters of such importance among the industries of Oregon that many young men are asking for special training for these fields. Following the second year in the School of Forestry, such men have open to them a carefully selected group of elective subjects which are considered as especially adapted to their needs. Men majoring in Lumber Manufacture will be granted the regular bachelor's degree in Forestry.

Curricula. Two curricula leading to the bachelor's degree are offered, one in General Forestry and one in Logging Engineering.

Advanced Degrees. The professional degree of Master of Science in Forestry or in Logging Engineering is offered to graduates of the College, or other colleges of equal rank, who have attained the degree of Bachelor of Science in the corresponding forestry curriculum, and met the College requirements for graduate study (as given on pages 38-39). These requirements specify one full year of resident work amounting to 48 college credits, including an acceptable thesis.

Equipment. The School of Forestry is housed in the Forestry Building, a thoroughly modern three-story structure 80 feet wide by 136 feet long. The building contains roomy laboratories for work in silviculture, dendrology, mensuration, forest protection, wood technology, drafting, lumber grading, and logging devices and equipment. Through the courtesy of the manufacturers of logging equipment much valuable logging machinery has been accumulated for demonstration purposes. Lumber manufacturing concerns have generously supplied the School with wood products made from various species of Oregon trees. All available publications dealing with general forestry, logging, or lumber manufacture are provided for the use of students.

Actual field work, so essential in preparing men for work in forestry and logging engineering, is made possible by the fact that large areas of timbered lands are easily accessible from the College. Some of the largest lumber manufacturing plants in the Northwest are located within two or three hours' ride from Corvallis. Located as it is in the heart of the greatest timbered region of the United States, the School of Forestry possesses unique advantages for preparing men for service in professional forestry, logging engineering, and lumber manufacture. Through the generosity of the Spaulding Logging Company, 160 acres of forest land has been given to the School of Forestry for demonstration purposes. Part of this area has been recently logged over, and part is covered with second growth Douglas fir. This tract affords an excellent opportunity for silvicultural experiments.

CURRICULUM IN GENERAL FORESTRY

(B.S. Degree)

The following courses are for freshman and sophomore students who desire to work for a degree either in General Forestry or in Logging Engineering. For graduation the College requires the student to complete 207 credits. The student is expected to complete the professional work as outlined below. Other subjects may be substituted only upon the approval of the Dean. Freshman and sophomore requirements are modified only in exceptional cases.

Freshman Year

	Term		
	1st	2d	3d
General Forestry (F 111, 112).....	4	3	---
Elementary Mensuration (F 123).....	---	---	4
English Composition (Eng 101, 102), Technical Composition (Eng 103).....	3	3	3
Plane Trigonometry (Mth 111).....	4	---	---
Elementary Analysis (Mth 131, 132).....	---	4	4
General Botany (Bot 101), The Plant Kingdom (Bot 202) or General Chemistry (Ch 101, 102).....	4	3	---
Plane Surveying (CE 125, 126).....	(3)	(3)	---
Gymnastics and Calisthenics (PEm 111, 112, 113).....	---	3	5
Military Science and Tactics.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	2	2	2
	<hr/>	<hr/>	<hr/>
	17 $\frac{1}{2}$	18 $\frac{1}{2}$	18 $\frac{1}{2}$

Sophomore Year

Mensuration (F 221, 222, 223).....	4	4	4
Tree Identification (F 253).....	---	---	5
Engineering Physics (Ph 111, 112, 113).....	3	3	3
Introduction to Economics (ES 391).....	---	3	---
Labor Problems (ES 301).....	---	---	4
Engineering Drawing (CE 211).....	3	---	---
Forest Survey and Mapping (F 224, 225).....	5	5	---
Gymnastics and Calisthenics (PEm 211, 212, 213).....	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Military Science and Tactics.....	2	2	2
	<hr/>	<hr/>	<hr/>
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	18 $\frac{1}{2}$

The following courses are for junior and senior students who are working for a degree in General Forestry.

Junior Year

	Term		
	1st	2d	3d
Identification of Woods (F 331).....	4	---	---
Uses of Wood (F 332).....	---	3	---
Forest Protection (F 212).....	---	---	4
Silviculture (F 341, 342, 343).....	4	4	4
Forest Administration (F 311).....	3	---	---
State and Local Government (PS 302).....	---	3	---
Principles of Accounting for Engineers (FA 385).....	---	---	3
Electives.....	5	6	5
	<hr/>	<hr/>	<hr/>
	16	16	16

Recommended Electives

	Term		
	1st	2d	3d
National Government (PS 301)	3	---	---
Advanced Business Law (PS 201, 202)	---	4	4
Forest Pathology (Bot 314)	---	3	---
Range and Pasture Botany (Bot 341)	---	3	---
Plant Ecology (Bot 442)	---	---	3
General Chemistry (Ch 101, 102, 103)	3	3	3
Forest Entomology (Ent 321, 422)	4	3	---
Practical Public Speaking I (PSP 254)	---	---	3

Senior Year

Forest Finance (F 411, 412)	5	5	---
Economics of Lumber Industry (F 413)	---	---	5
Dendrology (F 451, 452)	4	4	---
Lumber Manufacture (LE 496)	---	---	4
Timber Technology (F 431, 432, 433)	4	4	4
Seminar (F 461, 462, 463)	1	1	1
Electives	3	3	3
	17	17	17

Recommended Electives

Money and Banking (ES 311)	4	---	---
Materials of Engineering (MM 311)	---	3	---
Transportation (ES 403)	---	---	4
American Literature (Eng 431, 432)	3	3	---
General Geology (G 301c)	---	---	3
Wood and Steel Structures (CE 488)	3	---	---
Business Correspondence (Eng 105)	---	3	---
Forest Management (F 416)	---	---	5

CURRICULUM IN LOGGING ENGINEERING*(B.S. Degree)***Freshman and Sophomore Years**

The work for these years is the same as that for the corresponding years in the General Forestry Curriculum.

The following courses are for junior and senior students who are working for a degree in Logging Engineering.

Junior Year

	Term		
	1st	2d	3d
Identification of Woods (F 331)	4	---	---
Uses of Wood (F 332)	---	3	---
Logging Machine Design (LE 483)	---	---	3
Bridge Design (LE 484)	3	---	---
Logging Devices and Equipment (LE 481, 482)	---	3	3
Advanced Business Law (PS 201, 202)	4	4	---
Forest Protection (F 212)	---	---	4
State and Local Government (PS 302)	---	3	---
Principles of Accounting for Engineers (FA 385)	---	---	3
Electives	6	4	4
	17	17	17

Recommended Electives

	Term		
	1st	2d	3d
National Government (PS 301)	3	---	---
Materials of Engineering (MM 311)	---	3	---
Machine Shop (IA 363)	---	---	3
Differential and Integral Calculus (Mth 251, 252, 253).....	4	4	4
General Chemistry (Ch 101, 102, 103)	3	3	3
Steam and Gas Machinery (ME 232)	---	3	---

Senior Year

Timber Transportation (LE 371, 372, 373)	5	5	5
Topographic Logging Plans (LE 471, 472, 473)	5	5	5
Seminar (F 461, 462, 463)	1	1	1
Electives	5	5	5
	16	16	16

Recommended Electives

Forest Finance (F 411, 412)	5	5	---
Economics of Lumber Industry (F 413)	---	---	5
Corporation Accounting I (FA 201)	3	---	---
Business Organization and Management (FA 381)	---	---	3
Cost Accounting (FA 301)	3	---	---
Lumber Manufacture (LE 496)	---	---	4
Logging Methods (LE 493)	---	3	---
General Geology (G 301c)	---	---	3
Efficiency Systems (F 316)	---	---	4

Lumber Manufacture

Students who expect to enter some branch of the lumber manufacturing industry are advised to elect certain of the following courses during their junior and senior years.

	Term		
	1st	2d	3d
Identification of Woods (F 331)	4	---	---
Uses of Wood (F 332)	---	3	---
Advanced Business Law (PS 201, 202)	4	4	or (4)
Forest Finance (F 411, 412)	5	5	---
Economics of the Lumber Industry (F 413)	---	---	5
Lumber Manufacture (LE 496)	---	---	4
Timber Technology (F 431, 432, 433)	4	4	4
Lumber Mill Studies (F 37X) (Field work)	6	---	---
Transportation (ES 403)	---	---	4
Money and Banking (ES 311)	4	---	---
Cost Accounting (FA 301)	3	---	---
Business Organization and Management (FA 381)	---	3	or (3)
Wood and Steel Structures (CE 488)	3	---	---
Strength of Materials (MM 353)	---	---	3
Mechanics (Statics) (MM 351)	3	---	---
Machine Design (ME 411)	3	---	---
Principles of Accounting for Engineers (FA 385)	---	---	3

GENERAL FORESTRY

COURSES

F 111. General Forestry. Forest regions of the United States; the forests of the world, their distribution and importance; preliminary survey of the whole field of forestry.

Required in Forestry and Logging Engineering; elective to others; freshman year; first term; 4 credits; 4 lectures and recitations. *E. G. Mason*

F 112. General Forestry. Origin and distribution of our public domain; development of forestry in the United States; forestry as a timber production problem; forestry as a land problem; present status of forestry legislation.

Required in Forestry and Logging Engineering; elective to others; freshman year; second term; 3 credits; 3 lectures and recitations. Fee \$1.00. *E. G. Mason*

F 123. Elementary Mensuration. Federal survey system; identification of corners and lines; retracing surveyed lines; section subdivision; pacing, use of compass, abney hand level and trailer chain; instruments and devices used in measuring diameters and heights of trees, units of timber measurement; methods of covering ground in timber cruising; simple map work.

Required in Forestry and Logging Engineering; freshman year; third term; 4 credits; 3 recitations; 1 three-hour laboratory period. Fee \$2.00. *E. G. Mason*

F 212. Forest Protection. Protecting forests from fire; Federal, state, and private agencies; methods and equipment of prevention and control; forest insect control; forest pathology.

Required in Forestry and Logging Engineering; junior year; third term; 4 credits; 4 lectures and recitations. *E. L. Morvat*

F 221. Mensuration. (Measurement of felled timber and its products.) Systems and units of measurement used in forest mensuration; measurement of logs in cubic contents; measurement of logs in board feet contents; the construction of log rules; practice in scaling and grading logs; laws governing log scaling; log brands and marks; comparison of scales; measurement of piling, poles, post, ties, pulpwood, shingle-bolts, tan bark, and cord measurements.

Required in Forestry and Logging Engineering; sophomore year; first term; 4 credits; 3 recitations; 1 three-hour field or laboratory period. Fee \$2.00. *E. G. Mason*

F 222. Mensuration. (Measurement of standing timber.) Units of measurement for standing timber; the construction of volume

tables; the form of trees, taper tables, form classes and form factors; measurement of standing timber in various units; principles of cruising; methods of cruising; accuracy and costs in cruising; forest survey and forest appraisals.

Required in Forestry and Logging Engineering; sophomore year; second term; 4 credits; 3 recitations; 1 three-hour field period. Fee \$2.00. *E. G. Mason*

F 223. **Mensuration.** (The growth of timber.) Principles underlying the study of growth; determining the age of stands; growth of trees in diameter, height, and volume; growth of stands; yield tables; prediction of growth, growth percent, current and periodic growth; determination of growth for large areas; the forest survey and growth for the forest.

Required in Forestry and Logging Engineering; sophomore year; third term; 4 credits; 2 recitations; 2 three-hour field periods. Fee \$2.00. *E. G. Mason*

F 224. **Forest Survey and Mapping.** A course designed to train students to survey forested areas according to methods approved by foresters and logging engineers, obtaining topographic data by use of engineer's level, stadia, transit, plane table, aneroid, topographic abney, and trail tape. Drill in detail of forest mapping; recording notes.

Required in Forestry and Logging Engineering; sophomore year; first term; 5 credits; 3 recitations; 2 three-hour laboratory periods. Fee \$2.00. *E. L. Mowat*

F 225. **Forest Survey and Mapping.** A continuation of F 224. Required in Forestry and Logging Engineering; sophomore year; second term; 5 credits; 3 recitations; 2 three-hour laboratory periods. Fee \$2.00. *E. L. Mowat*

F 253. **Tree Identification.** Field characteristics and classification of principal timber trees of the Pacific Coast, their commercial range, local occurrence, size, growth, form, climate, soil, and moisture requirements; resistance; relative tolerance and reproduction. The fundamental purpose is to teach the student to identify commercial timber trees.

Required in Forestry and Logging Engineering; sophomore year; third term; 5 credits; 3 lectures; 2 three-hour laboratory or field periods. Fee \$2.00. *E. L. Mowat*

F 311. **Forest Administration.** Federal forests; Forest Service organization; national supervision; the district; the forest as an administrative unit; administration of state forests; private forests.

Required in Forestry; junior year; first term; 3 credits; 3 lectures and recitations.

E. L. Mowat

F 316. Efficiency Systems. General discussion of efficiency systems; special application to lumber industry; cost-keeping systems and their comparative values; organization; cost keeping versus bookkeeping, bonus, merit, profit-sharing, and piece systems; labor problems as applied to logging industry; present-day labor management as practiced in modern logging operations.

Elective in Logging Engineering; junior year; third term; 4 credits; 4 lectures. Fee \$4.00.

F 331. Identification of Woods. Study of wood structure; identification of important commercial woods; physical and structural properties; study of standard commercial grading rules; practical work in grading manufactured lumber.

Required in Forestry; elective in Logging Engineering; junior year; first term; 4 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$2.00.

T. J. Starker

F 332. Uses of Wood. Adaptation to commercial uses; chief wood-using industries and relative amounts of principal commercial species used annually; adaptation of wood to special purposes; substitutes for wood; minor uses of wood, pulp, fiber board, etc.; by-products.

Required in General Forestry; elective in Logging Engineering; junior year; second term; 3 credits; 2 lectures; 1 two-hour laboratory period. Fee \$2.00.

T. J. Starker, E. L. Mowat

F 334. Commercial Woods. Designed primarily to meet requirements of the woodworker in choosing species of wood best adapted to his needs, and in identifying woods commonly used; macroscopic and microscopic identification of different species; dendrology and its significance in wood technology; taxonomy, showing how trees are classed.

Required in Industrial Arts; junior year; third term; 3 credits; 2 lectures; 1 two-hour laboratory period. Fee \$2.00.

T. J. Starker

F 341. Silviculture. (Silvies). Treats of the life-history of trees, tolerance, soil requirements, climate. Forest description; forest ecology; forest types.

Required in Forestry; junior year; first term; 4 credits; 3 lectures; 1 two-hour laboratory period. Fee \$2.00.

T. J. Starker

F 342. Silviculture. Systems of cutting; marking trees for cutting; improvement of woodlands; protection as related to silviculture; natural and artificial regeneration.

Required in Forestry; junior year; second term; 4 credits; 3 recitations; 1 two-hour laboratory period. Fee \$2.00.

T. J. Starker, E. L. Mowat

F 343. Silviculture. Nursery practice; field planting; collection and storage of forest tree seeds; sample plot work. Actual nursery practice and one detailed examination trip to a large nursery.

Required in Forestry; junior year; third term; 4 credits; 3 recitations; 1 two-hour laboratory period. Fee \$2.00.

T. J. Starker

F 37X. Field Work. Based upon practical work performed by the student between the sophomore and junior years or between the junior and senior years. Work must be done on some modern logging operation or in connection with some technical forestry work carried on by the state or by the Forest Service. A report based upon an approved outline must be submitted.

Elective in Forestry and Logging Engineering; junior or senior year; 1 to 6 credits.

F 411, 412. Forest Finance. Investments and costs in forest production; value of forest property for destructive lumbering and for continued timber production; appraisal of damages due to the destruction of forest property; forest taxation; stumpage values; comparison of forest values with agricultural values; timber bonds; ultimate ownership of forest lands.

Required in Forestry and Logging Engineering; senior year; first and second terms; 5 credits each term; 5 lectures and recitations.

G. W. Peavy

F 413. Economics of the Lumber Industry. Brief history of lumbering in the United States; stumpage prices; prices of manufactured lumber; shifting centers of production; transportation; freight rates; substitutes and their effects; lumbermen's associations; present rate of consumption and the future supply; function of the Government in the future of the industry.

Required in Forestry and Logging Engineering; senior year; third term; 5 credits; 5 lectures and recitations.

G. W. Peavy

F 416. Forest Management. (Forest organization and working plans.) Ownership, classification, and uses of land; acquisition of forest lands; investigative projects to determine forestry principles and methods; administrative projects to determine location, areas and quantities; divisions of the forest; regulation of the forest; sustained yield; working plans; revision of working plans.

Elective in Forestry; senior year; third term; 5 credits; 4 lectures; 1 two-hour conference period.

G. W. Peavy

F 431. **Timber Technology.** (Lumber seasoning.) Fundamental principles underlying seasoning and kiln drying of woods; kiln drying methods and their merits; effect of kiln drying upon wood structure; types of kilns; study of recording instruments used.

Required in Forestry; senior year; first term; 4 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$3.00. *T. J. Starker*

F 432. **Timber Technology.** Preservatives and methods of treatment; manufacture of alcohol, turpentine, resin, tar, and other chemical products from wood; closer utilization of wood waste; glues and methods of use.

Required in Forestry; senior year; second term; 4 credits; 3 lectures; 1 two-hour laboratory period. Fee \$2.00. *T. J. Starker*

F 433. **Timber Technology.** A continuation of F 432.

Required in Forestry; senior year; third term; 4 credits; 3 lectures; 1 two-hour laboratory period. Fee \$2.00. *T. J. Starker*

F 451, 452. **Dendrology.** Classification and identification of forest trees, including study of forest ecology and taxonomy; silvical characteristics, and distribution of commercial species; life-history and requirements of trees.

Required in Forestry; senior year; first and second terms; 4 credits each term; 2 recitations; 2 two-hour laboratory periods. Fee \$2.00 each term. *T. J. Starker*

F 461, 462, 463. **Seminar.** Preparation and discussion of reports of special subjects; current forestry and lumbering literature; labor problems. Each student is required to prepare a thesis on some assigned subject.

Required in Forestry and Logging Engineering; senior year; three terms; 1 credit each term; 1 two-hour conference period.

G. W. Peavy

LOGGING ENGINEERING

COURSES

LE 37X. **Field Work.** Same as F 37X; see page 275.

LE 371. **Timber Transportation.** Chute and flume construction; pole roads; motor trucks; railroads adapted to logging operations.

Required in Logging Engineering; senior year; first term; 5 credits; 3 lectures; 2 three-hour laboratory periods. Fee \$4.00.

H. R. Patterson

LE 372. Timber Transportation. Distinction between logging railroads and common carrier railroads; grades; alignment; economic theory of location and construction.

Required in Logging Engineering; senior year; second term; 5 credits; 3 lectures; 2 three-hour laboratory periods. Fee \$4.00.

H. R. Patterson

LE 373. Timber Transportation. Structures and materials used in logging railroads, costs of surveys, construction, operation and maintenance; bridge and tunnel construction.

Required in Logging Engineering; senior year; third term; 5 credits; 3 lectures; 2 three-hour laboratory periods. Fee \$4.00.

H. R. Patterson

LE 471, 472, 473. Topographic Logging Plans. Plans for logging operations; making topographic map of timbered area; timber cruised and complete set of plans worked out, showing proper location of main-line logging railroads, railroad spurs, rollways or landings, pole roads, swing settings, logging area lines; estimates of costs.

Required in Logging Engineering; senior year; three terms; 5 credits each term; 3 recitations; 2 three-hour field periods. Fee \$5.00 each term.

H. R. Patterson

LE 481. Logging Devices and Equipment. Rigging; types of logging railroad locomotives, cars, and trucks; donkey engines, aerial equipment, skidders, loading and unloading devices; construction equipment, inclines, wire rope; fire prevention equipment; modern camp layouts.

Required in Logging Engineering; junior year; second term; 3 credits; 1 lecture; 2 three-hour laboratory periods. Fee \$4.00.

H. R. Patterson

LE 482. Logging Devices and Equipment. A continuation of LE 481.

Required in Logging Engineering; junior year; third term; 3 credits; 1 lecture; 2 two-hour laboratory periods. Fee \$3.00.

H. R. Patterson

LE 483. Logging Machine Design. Designing logging equipment, rigging, and tools; drawings of standard equipment constructed in camp shops.

Required in Logging Engineering; junior year; third term; 3 credits; 1 lecture; 2 laboratory periods. Fee \$3.00.

H. R. Patterson

LE 484. Bridge Design. Principles of the design of wood structures as applied to logging railroad practice. Stresses in

simple trusses; details, specifications, and estimates for Howe truss.

Required in Logging Engineering; junior year; first term; 3 credits; 1 recitation; 2 two-hour laboratory periods. Fee \$3.00.

H. R. Patterson

LE 493. **Logging Methods.** Yarding, skidding, and loading of logs by all known methods; falling and bucking; relative merits of various methods; all known methods of handling timber from the standing tree to the mill.

Elective in Logging Engineering; senior year; second term; 3 credits; 3 lectures.

H. R. Patterson

LE 496. **Lumber Manufacture.** Discussion of various types of modern mills; manufacture of secondary products; electrical versus steam mills; lumber-handling devices; examinations of up-to-date mills and reports on them. Field trips required.

Required in Forestry; elective in Logging Engineering; senior year; third term; 4 credits; 3 lectures; 1 two-hour laboratory period.

T. J. Starker

School of Home Economics

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.

AVA BERTHA MILAM, Ph.B., A.M., Dean of the School of Home Economics.

HELEN LEE DAVIS, A.B., B.S., Vice-Dean of the School of Home Economics; Professor of Household Art.

OLGA BRUCHER, B.S., Secretary.

Home Economics Education

FLORENCE BLAZIER, Ph.B., M.A., Professor of Home Economics Education.

BESS CHAPPELL, B.S., M.A., State Supervisor of Home Economics; Teacher Trainer.

LURA AMELIA KEISER, B.S., Critic Teacher in Home Economics Education.

MARY STEWART LYLE, B.S., M.S., Critic Teacher in Home Economics Education.

Household Administration

ALMA GRACE JOHNSON, B.S., Professor of Household Administration.

EMMA SKINNER WELD, Ph.B., Assistant Professor of Household Administration.

KATHERINE BARBARA HAIGHT, R.N., Instructor in Home Nursing.

SARA WATT PRENTISS, B.S., Instructor in Household Administration.

RUBY EVANGELINE BEERS, B.S., Instructor in Household Administration.

Household Art

HELEN LEE DAVIS, A.B., B.S., Professor of Household Art.

LILA MORRIS O'NEALE, A.B., B.S., Associate Professor of Household Art.

MARGARET MOREHOUSE, B.S., Instructor in Household Art.

MARY STANDERWICK VAN KIRK, Instructor in Household Art.

MARION HODGSON OLIVER, B.S., Instructor in Household Art.

GERTRUDE STRICKLAND, Instructor in Household Art.

BLANCHE WHITTIER STEVENS, B.S., Instructor in Household Art.

GLADYS LOUISE WHIPPLE, B.S., Instructor in Household Art.

GLADYS PETERSON, B.S., Instructor in Millinery.

HELEN BOAK KAY, B.A., Instructor in Household Art.

Household Science

JESSAMINE CHAPMAN WILLIAMS, B.S., M.A., Professor of Household Science.

ELEANOR REED MACLAY, B.S., M.A., Associate Professor of Household Science.

EMMA SKINNER WELD, Ph.B., Assistant Professor of Household Science.

AMELIA EARLE BURNS, B.S., Instructor in Household Science.

BERNICE CORNELIA WAIT, M.S., Instructor in Household Science.

LILLIAN CATHERINE TAYLOR, B.S., Instructor in Household Science.

SARA WATT PRENTISS, B.S., Instructor in Household Science.

Institutional Management

SIBYLLA HADWEN, Professor of Institutional Management; Director of Women's Dormitories.

ELIZABETH FLORA, B.S., Instructor in Institutional Management; Assistant Director of Women's Dormitories.

HERTTA VASANOJA, B.S., Supervisor of Tea-room.

The scope of the work in Home Economics is fourfold: it prepares for homemaking, for teaching, for institutional management or other administrative work, and for commercial pursuits.

Training in homemaking is fundamental in all the work, but a distinct curriculum, the General Curriculum, provides especially for those whose main object in attending college is preparation for home life. Courses in English, art, history, modern languages, science, and the other departments of general training, supplement the technical courses in this curriculum, which aims to provide a liberal as well as a technical education. The true homemaker not only must be trained in the science and the art of the household, but also must have a well-rounded personality, with intelligent interests, trained judgment, and cultivated tastes, enabling her to solve successfully the problems of the modern home, with its complex social and civic relationships.

In the Professional Curriculum, which prepares for the more technical pursuits, the work is largely prescribed for the first two years. In the junior and senior years the student may specialize in some particular field, as in the teaching of Home Economics, institutional management, or commercial fields. Each of these in turn offers a variety of possibilities. Teaching positions include the teaching of Home Economics or some phase of it in secondary schools, colleges, universities, or other institutions of higher learning.

Facilities. The Home Economics Building is thoroughly equipped with the most modern facilities for carrying on all phases of Home Economics work. The Household Science department has a number of kitchens, including one dietetic laboratory, and three small apartments where family cookery and table service are taught. The eight sewing rooms are provided with the most modern equipment. A millinery laboratory, an applied design laboratory, and a textile exhibit room for the display of permanent and temporary exhibits are included in the facilities of the Household Art department. In addition to a large housewifery laboratory, a home-nursing room and a child-care room, the Household Administration department operates a nine-room Home Management House on the campus. The Institutional Management department is unusually well provided with space and equipment. The Tea-room, with a seating capacity of 300, approximates a commercial establishment in its appointments. It is supplied with ample kitchen, storage, and serving space, and is equipped with all modern labor-saving devices. The dormitories provide further means of acquaintance with the problems of institutional work. The supervised teaching is carried on in the public schools of Corvallis, the plant and equipment of the high schools being used by the student-teacher group. Besides offices for the various departments, stock and storage rooms, and lecture and recitation rooms, a large attractive room on the first floor is appropriately furnished for a rest and study room for women students.

Curricula. The School of Home Economics offers the following:

I. A four-year General Curriculum leading to the degree of Bachelor of Science planned for students who, while not desiring training as professional teachers of Home Economics, wish training in the principles of homemaking together with a general cultural education. Although students in this curriculum must meet the institutional requirement for a major in Home Economics, the liberal proportion of electives permits the taking of courses in any department in the College in which the student is interested, subject of course to proper balancing of work according to an approved program. Students pursuing courses in the School of Vocational Education, by taking the required number of credits, may qualify as teachers in Oregon high schools.

II. A four-year Professional Curriculum leading to the degree of Bachelor of Science, including technical courses, together with basic arts and sciences, languages, history, economics, and sociology, for those desiring training not only for homemaking but also for teaching Home Economics and for such vocations as institu-

tional management, social service, and educational extension work. The studies the first two years are prescribed and give the necessary foundation for any of the occupations. During the junior and senior years specialization within limits is possible. A student completing this curriculum meets the requirements of the Federal Board for Vocational Education for the Smith-Hughes teacher.

III. A Graduate Curriculum leading to the degree of Master of Science.

IV. A suggested one-year Institutional Management curriculum leading to a certificate. (For outline see page 285.)

V. Homemaking courses for homemakers, special students, and students registered in other schools on the campus. The following courses are planned especially to meet the needs of these groups.

	Credits
Clothing and Textiles (HA 108, 109, 110).....	4 each term
Clothing Selection and Construction (HA 118).....	4
Food Selection and Preparation (HS 203, 204, 205).....	4 each term
Child Care (HAd 325)	3
Millinery (HA 328)	2
Home Nursing (HAd 435)	3
Home Planning and Furnishing (HA 438)	3
Principles of Dietetics (HS 200)	1
Clothing Selection (HA 218)	3
Textile Design and Color (HA 428)	3
Household Management (HAd 445)	3

Requirements for Graduation. For the bachelor's degree in Home Economics a minimum of 192 college credits must be completed. The work should be distributed as suggested by the following curricula outlines.

Fees. A fee of \$4.50 a term is charged all students registered in Home Economics. A fee of \$0.75 per credit is charged all students registered in other schools for courses taken in the School of Home Economics.

GENERAL CURRICULUM IN HOME ECONOMICS

(B.S. Degree)

Not more than one-third of the 192 credits required for a degree may be in Home Economics. Of the remainder, 62 credits are required courses in arts and sciences. Of the 78 elective credits, a total of 28 credits must be in arts and science courses selected, with the approval of the Dean, with a view to insuring a proper balance of subjects.

Freshman Year

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Modern Language, Mathematics, Science, or Art.....	3	3	3
Clothing and Textiles (HA 108, 109, 110) for students not electing Art	4	4	4
or Clothing and Textiles (HA 111, 112, 113) for students electing Art	(3)	(3)	(3)
Social Ethics (PEw 121), Hygiene (PEw 122)	1	1	---
Introduction to Home Economics (HAd 100)	1	---	---
Library Practice (Lib 100)	1	1	---
Gymnastics (PEw 111, 112, 113)	1	1	1
Electives	3	3	3
	16	16	14

Sophomore Year

English	3	3	3
Modern Language, Mathematics, or Science	3	3	3
General Bacteriology (Bac 200)	---	---	3
Food Selection and Preparation (HS 203, 204, 205) for students not electing Chemistry	4	4	4
Industrial Journalism (IJ 200) or Practical Public Speaking I (PSP 254)	3	---	---
Gymnastics (PEw 211, 212, 213)	1	1	1
Electives	3	5	3
	17	16	17

Junior Year

Economics; Political Science; Finance and Administration or Sociology	3	3	3
History of Western Civilization II, III (Hst 212, 213)	---	3	3
History of Latin America (Hst 331), or History of the Pacific Ocean Area (Hst 361)	3	---	---
Elements of Physiology (ZP 321, 322)	3	3	---
Housewifery (HAd 210)	3	---	---
Child Care (HAd 325)	---	3	---
Household Sanitation (HAd 305)	---	---	3
Gymnasium	4 $\frac{1}{2}$	4 $\frac{1}{2}$	7 $\frac{1}{2}$
Electives	4	4	7
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$

Senior Year

Household Management (HAd 445)	3	---	---
Home Nursing (HAd 435)	---	3	---
Gymnasium	3 $\frac{1}{2}$	3 $\frac{1}{2}$	16 $\frac{1}{2}$
Electives	13	13	13
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$

¹If a modern language is chosen, at least two consecutive years of that language must be completed. Students must offer at least 9 credits in Biologic or Physical Science for graduation (see page 37, Required Subjects).

PROFESSIONAL CURRICULUM IN HOME ECONOMICS

(B.S. Degree)

Freshman Year

	Term		
	1st	2d	3d
General Chemistry (Ch 101, 102, 103)	3	3	3
Clothing and Textiles (HA 111, 112, 113)	3	3	3
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Drawing and Design (A 110)	3	.....	.....
Design (A 120) .....	.....	3	.....
Color Harmony (A 130) .....	.....	.....	3
Social Ethics (PEW 121), Hygiene (PEW 122)	1	1	.....
Introduction to Home Economics (HAD 100)	1	.....	.....
Library Practice (Lib 100) .....	.....	1	.....
Gymnastics (PEW 111, 112, 113)	1	1	1
Elective .....	.....	.....	3
	15	15	16

Sophomore Year

Organic Chemistry (Ch 221)	5	.....	.....
Chemistry of Foods and Digestion (Ch 200*) .....	.....	5 or (5)	(5) or 5
General Physics (Ph 200*) .....	.....	.....	.....
The History of Western Civilization II (Hst 212)	3	.....	.....
Food Selection and Preparation (HS 211, 212, 213)	4	4	4
¹ English or Modern Language	3	3	3
Gymnastics (PEW 211, 212, 213)	1	1	1
Electives .....	.....	3	3
	16	16	16

Junior Year

Elementary Psychology (Psy 301)	3	.....	.....
Elements of Physiology (ZP 321, 322)	3	3	.....
General Bacteriology (Bac 204, 205) .....	.....	3	3
Costume Design and Clothing Selection (HA 331) .....	.....	3	.....
Advanced Clothing and Textiles (HA 311) .....	.....	.....	5
Child Care (HAD 320) .....	.....	.....	3
Housewifery (HAD 210)	3	3	.....
Nutrition (HS 320, 321) .....	.....	3	3
Design and Color Use (A 333) .....	.....	3	.....
Electives	8	2	2
	17	17	16

Senior Year

Home Nursing (HAD 430)	3	.....	.....
House Decoration (HA 431) .....	.....	3	.....
Household Management (HAD 440)	3	.....	.....
Economics; Political Science; Finance and Administration or Sociology	3	3	3
Electives	7	10	13
	16	16	16

*Ch 200 (one term, 5 credits) replaces Ch 222, 223 (two terms, 2½ credits each), and Ph 200 (one term, 5 credits) replaces Ph 202, 203 (two terms, 2½ credits each).

¹If a modern language is chosen, at least two years of that language must be completed.

For students preparing to teach Home Economics the following sequence is suggested.

Junior Year

	Term		
	1st	2d	3d
Elementary Psychology (Psy 301)	3	---	---
Principles of Teaching (Ed 311)	3	---	---
Educational Psychology (Psy 322)	---	3	---
Secondary Education in Home Economics (HEd 304)	---	---	3

Senior Year

Secondary Education in Home Economics (HEd 305)	3	---	---
Supervised Teaching in Home Economics (HEd 421)	---	4	---
Electives	---	---	4

Students planning to teach in a Smith-Hughes school must have in addition to 6 weeks supervised teaching, 6 weeks field work in a Smith-Hughes school which will include Organization and Management of Smith-Hughes. Home Management House (HAD 450) and Household Management (HAD 440) are also required.

SUGGESTED SUBJECTS FOR ONE YEAR IN INSTITUTIONAL MANAGEMENT

Not more than 17½ credits a term may be selected from this suggested group of courses.

	Term		
	1st	2d	3d
Physiology (ZP 321, 322)	3	3	---
Bacteriology (Bac 200)	---	---	3
Institutional Cooking and Marketing (IM 310)	3	---	---
Business Management for Women (FA 371)	---	---	3
Meats (AH 475)	---	1	---
Food Selection and Preparation (HS 203, 204, 205)	4	4	4
Tea-room Management (IM 430)	---	3	---
Practice in Institutional Management (IM 330)	---	3	---
Advanced Institutional Management (IM 431)	---	2	---
Advanced Institutional Management and Administration (IM 431)	---	2	---
Practice in Advanced Institutional Management (IM 432)	---	---	3
Home Nursing (HAD 435)	---	---	3
English Composition (Eng 101)	3	---	---
Business Correspondence (Eng 105)	---	---	3
Home Planning and Furnishing (HA 438)	3	---	---
Principles of Accounting I (FA 101)	3	---	---

HOME ECONOMICS EDUCATION

The function of this department is to give professional training to prospective teachers of Home Economics. Any student having a scholarship average below 85 should confer with the head of the department before registering for teacher training work.

COURSES

Required in Professional Curriculum

HEd 304. **Secondary Education in Home Economics.** A brief history of Home Economics instruction and of the development

of elementary and secondary Home Economics; equipment and organization of Home Economics departments; study of Smith-Hughes problems in Home Economics.

Prerequisites: Psy 301, Ed 311. Junior year (second term) or senior year (first term); 3 credits; 3 recitations.

Florence E. Blazier

HEd 305. Secondary Education in Home Economics. Making of lesson plans; study of special problems, the preparation and collection of illustrative material; making of courses of study. Observation of teaching.

Prerequisite: HEd 304. Junior year (third term) or senior year (first term); 3 credits; 3 recitations.

Florence E. Blazier

HEd 421. Supervised Teaching in Home Economics. Observation and teaching under supervision in the Corvallis junior and senior high schools.

Prerequisite: HEd 305. Senior year; any term; 4 credits; 2 recitations; 5 double periods supervised teaching.

Florence E. Blazier, Lura A. Keiser, Mary S. Lyle

HEd 422. Supervised Teaching in Home Economics. Continuation of HEd 421. An advanced course.

Prerequisite: HEd 421 or teaching experience. Elective; senior year; any term; 1 to 3 credits.

Florence E. Blazier, Lura A. Keiser, Mary S. Lyle

HOUSEHOLD ADMINISTRATION

Equipment. The department has offices, classrooms, and laboratories in the Home Economics Building. A well-equipped and self-supporting Home Management House, where students may study concrete problems of home management, is located on the campus.

COURSES

GENERAL

Required: HAd 100, 210, 325, 435, 445.

Elective: HAd 450.

PROFESSIONAL

Graduate: HAd 691, 692, 693.

Required: HAd 100, 210, 320, 430, 440.

Elective: HAd 450, 455.

For students in COMMERCE, VOCATIONAL EDUCATION, PHYSICAL EDUCATION, PHARMACY, etc.

Elective: HAd 100, 210, 325, 435, 445, 450.

HAd 100. Introduction to Home Economics. A course for beginning students. Purpose, value, and scope of Home Economics.

Freshman year; first or second term; 1 credit; 1 lecture.

Ava B. Milam

HAD 210. Housewifery. An application of science and economics to the care of the house and its furnishings.

Sophomore year; any term; 3 credits; 1 recitation; 2 two-hour laboratory periods. Fee \$2.00.

Ruby E. Beers

HAD 320. Child Care. Development of the child from the time of conception, through infancy, childhood, and adolescence; eugenics; prenatal care; habit formation; proper feeding; child welfare; responsibility of parenthood.

Prerequisites (or parallel): HS 213, ZP 321. Junior year; any term; 3 credits; 3 lectures.

Mrs. Sara W. Prentiss

HAD 325. Child Care. A study of growth and development of child through prenatal period; infancy, childhood, and adolescence; factors influencing.

Junior year; any term; 3 credits; 3 recitations.

HAD 430. Home Nursing. Care of the patient under home conditions; symptoms; first aid; management of communicable diseases.

Prerequisites: Bac 205, ZP 321. Senior year; any term; 3 credits; 3 recitations.

Mrs. Katherine B. Haight

HAD 435. Home Nursing. Care of patient in home; demonstrations of ordinary nursing procedure; home substitutes; bandaging; emergencies; discussion of common diseases.

Senior year; any term; 3 credits; 3 recitations.

HAD 440. Household Management. An application of the principles of scientific management to the home; study of the management of household operations and finances; family and community relationships.

Junior or senior year; any term; 3 credits; 3 recitations.

A. Grace Johnson

HAD 445. Household Management. The management of the home; family operations and finances.

Senior year; any term; 3 credits; 3 recitations.

HAD 450. Home Management House. A course dealing with the problems of the homemaker. Students live in the Home Management House for six weeks and put into practice the training received in all other Home Economics or related courses. Actual child care.

Prerequisite: HS 205 or 213, or equivalent. Junior or senior year; any term; 4 credits; 3 hours work daily. Fee \$6.00 a week, living expenses.

A. Grace Johnson

HAd 455. Home Management House Supervision. A course designed to meet the needs of the student who expects to have charge of home management houses. Requires residence in and supervision of Home Management House for six weeks following HAd 450.

Prerequisite: HAd 450. Junior or senior year; any term; 3 credits. Fee \$6.00 a week, living expenses.

HAd 691, 692, 693. Thesis and Graduate Study. Chemical, physiological, bacteriological, economic, or sociological topics, according to the preference and training of the individual students, are investigated under the direction of the instructors in the several departments concerned.

Prerequisite: HAd 440. Senior or graduate year; three terms; credits and hours to be arranged.

HOUSEHOLD ART

Equipment. The department has offices, classrooms, and laboratories in the Home Economics Building. All necessary furnishings and equipment are available for thorough instruction in textiles, dressmaking, tailoring, costume design, clothing, house decoration, applied design, and millinery.

COURSES

GENERAL

Required: HA 108, 109, 110; or 111, 112, 113.

Elective: HA 328, 428, 438.

PROFESSIONAL

Required: HA 111, 112, 113, 311, 331, 431.

Elective: HA 316, 321, 322, 411, 412, 416, 432, 435.

For students in COMMERCE, VOCATIONAL EDUCATION, PHYSICAL EDUCATION, PHARMACY, etc.

Elective: HA 108, 109, 110 or 118, 119, 218, 328, 428, 431, 438.

HA 108*, 109*, 110*. Clothing and Textiles. Clothing, textiles, and costume design study to train the judgment and taste of women in the selection, use, and care of clothing and home furnishings, also to give practical experience in designing and constructing different types of garments, children's clothes, remodeled dresses, etc.

Freshman year; three terms; 4 credits each term; 2 lectures; 6 periods laboratory work; 4 hours preparation.

HA 111*. Clothing and Textiles. Adaptation of commercial patterns and practice in flat pattern designing; planning and constructing of sport skirts, blouses, and dresses with emphasis on

*Students having had no high school training in Home Economics or its equivalent in home or trade experience will register in Section A. The lecture and laboratory work in these courses is recorded separately, "A" designating lecture and "B" laboratory work.

proper choice of materials, design, and decoration from standpoint of appropriateness, economy, and beauty; textile study.

Freshman year; any term; 3 credits; 2 lectures; 4 periods laboratory work; 3 hours preparation.

HA 112*. **Clothing and Textiles.** Design and construction of lingerie and wool dresses, also children's clothes, with emphasis on design, appropriate decoration, and technique; practical study of materials to develop judgment in selection, use and care of clothing and home furnishings.

Prerequisites: HA 111, A 110. Freshman year; second term; 3 credits; 2 lectures; 4 periods laboratory work; 3 hours preparation.

HA 113*. **Clothing and Textiles.** Pattern modeling; design and construction of simple silk dresses; art blouses; more advanced technique and emphasis on design, proportions, color, and texture; textile study continued with aim of making more intelligent consumers; hygiene of clothing; ethics of dress; economics of dress, etc.

Prerequisites: HA 112, A 120. Freshman year; third term; 3 credits; 2 lectures; 4 periods laboratory work; 3 hours preparation.

HA 118. **Clothing Selection and Construction.** Appropriate designs and principles of construction worked out in planning and making garments; principles of art applied to dress; textile and clothing discussions.

Elective; any term; 4 credits; 2 lectures; 8 periods laboratory work.
Mary Van Kirk

HA 119. **Dress Selection and Construction.** Continuation of HA 118. (For students who plan to elect two terms only of clothing work, wishing to cover briefly the field of dress selection and construction.)

Prerequisite: HA 118 or equivalent. Elective; 3 credits; 1 lecture; 6 periods laboratory work.

HA 218. **Clothing Selection.** A brief lecture course intended to develop good taste in dress and to train the judgment of young

*In starred courses students having had no high school training in Home Economics or its equivalent in home or trade experience will register in Section A. The lecture and laboratory work in these courses is recorded separately, "A" designating lecture and "B" laboratory work.

women in selecting simple, conservative, but artistic, becoming, and appropriate clothes for themselves and others.

Elective; any term; 3 lectures; 3 credits.

HA 311*. **Advanced Clothing and Textiles.** This course aims to develop more independence, initiative, originality, and art in planning and designing garments for different types of figures, also greater skill and speed in construction. Advanced textile study.

Prerequisites: HA 113, A 130, HA 331 either prerequisite or parallel. Junior year; any term; 5 credits; 2 lectures; 4 two-hour laboratory periods; 5 hours outside work.

HA 316. **Historic Costumes and Their Textile Materials.** A series of lectures and discussions on men's and women's costumes from earliest times to the present day. The study of such allied subjects as tapestries, embroideries, laces, velvets, and satins is made from an appreciative and historical standpoint. Readings and reports.

Prerequisites: A 130, HA 331 prerequisite or parallel. Junior or senior year; any term; 3 credits; 3 lectures.

HA 321. **Beginning Millinery.** Designing and constructing frames; methods of covering; trimming and renovating.

Elective; any term; 3 credits; 1 lecture; 6 periods laboratory work.

HA 322. **Advanced Millinery.** Continuation of the work of HA 321 with the purpose of developing speed, originality, and greater skill in technique; increased emphasis on millinery as a creative art; good foundation for trade work.

Prerequisite: HA 321. Elective; any term; 2 credits; 1 lecture; 4 periods laboratory work.

HA 328. **Millinery.** Designing and construction of hats; trimming and renovating.

Elective; any term; 2 credits; 6 periods laboratory work.

HA 331. **Costume Design and Clothing Selection.** Study of human figure; principles of art applied to dress; historic costume and its relation to modern dress.

Prerequisite: A 130. Junior year; any term; 3 credits; 2 lectures; 4 periods laboratory work.

Mary Van Kirk

HA 411. **Dress Design.** Speed problems; designing, modeling, and constructing of afternoon and evening dresses; development of historical costume and its relation to modern fashions

*Lecture and laboratory recorded separately, "A" indicating lecture, "B" laboratory.

with aim of giving practical help and inspiration to students and teachers of dressmaking and costume design.

Prerequisites: HA 311, 331. Senior year; 3 credits; 1 lecture; 6 periods laboratory work.

HA 412. Trade Course in Dressmaking. (For students who wish to enter commercial work.) Broader training in selecting, designing, fitting, and constructing garments for different types of figures; organization of work from trade standpoint; emphasis on speed, economy, effectiveness, selling features, etc. Good foundation for specialty shop work.

Prerequisites: HA 311, 331; A 311. Senior year; any term; 2 to 4 credits; 1 lecture; 4 to 9 periods laboratory work.

HA 416. Tailoring. Development of principles and processes of tailoring; application on suits and coats.

Prerequisites: HA 311, 331. Elective in Summer Session; 3 credits; 9 periods laboratory work. Fee \$1.50.

HA 428. Textile Design and Color. Principles of design and color developed and applied in decorating clothing and home furnishing problems. No Art requirement.

Elective; any term; 3 credits; 1 lecture; 6 periods laboratory work.

HA 431. Home Planning and Furnishing. A study of the points to be considered in selecting, buying, and furnishing a small home from the standpoints of comfort, beauty, and economy.

Prerequisite: A 130. Junior or senior year; any term; 3 credits; 2 recitations; 1 lecture; 1 two-hour laboratory period.

HA 432. Interior Decoration. A study of the historic periods of decoration, decorative materials, and their appropriate use in houses of various types. Elective to students who have done satisfactory work in HA 431.

Senior year; any term; 2 credits; 2 recitations; 1 two-hour laboratory period.

HA 435. Textile Design. Decorative art involving careful consideration of line, form, proportion, and color; original designs executed in various media for clothing and house-furnishing problems; tie-dying, batik, and stencil decoration for textiles, embroidery, weaving, lamp shade making, etc.

Prerequisite: A 130. Junior or senior year; any term; 3 credits; 1 lecture; 6 periods laboratory work.

HA 438. Home Planning and Furnishing. A one-term course which aims to develop intelligent judgment in the selection of

home furnishings from the standpoints of art, economy, and comfort and to further good taste in choice and arrangement.

Elective; any term; 3 credits; 2 recitations; 1 lecture; 2 periods laboratory work; 4 hours preparation. *Margaret Morehouse*

Note: Students in Household Art courses who do not wish to make garments or hats for themselves may be furnished material through orders given the department.

HOUSEHOLD SCIENCE

Equipment. Two single laboratories accommodating twenty students each, and two double laboratories accommodating forty students each are well equipped with modern equipment. Gas, electric, and wood stoves in each laboratory make it possible to give full instruction in the use of these fuels and also provide opportunity for students to prepare foods in moderately large amounts. Three suites of kitchen, dining-room, and living-rooms are furnished in such a way as to show a wise selection for families on different incomes. These suites are used for class instruction in meal service.

Two complete approved uniforms are required for all students taking laboratory courses in Household Science. Directions for uniforms may be secured from the office of the Dean.

COURSES

GENERAL

Required: HS 203, 204, 205.

Elective: HS 310, 435.

PROFESSIONAL

Graduate: HS 691, 692, 693.

Required: HS 211, 212, 213, 320, 321.

Elective: HS 310, 420, 435.

For students in COMMERCE, VOCATIONAL EDUCATION, PHARMACY, etc.

Elective: HS 201, 203, 204, 205, 340, 350.

HS 200. Principles of Dietetics. The selection of a proper diet for health; food values in relation to cost, and the combination of foods in meals, based on dietetic principles.

Required in General Business and Secretarial Training (freshman year, third term) and in Pharmacy and Vocational Education (sophomore year, first term); elective to others; any term; 1 credit; 1 lecture. *Jessamine C. Williams*

HS 201. Food Selection and Preparation. A unit course for students who desire to learn food selection and preparation by meal service. Sections limited to eight.

Elective in Commerce and other departments; any term; 3 credits; 1 recitation; 2 two-hour laboratory periods.

Lillian C. Taylor

HS 203. Food Selection and Preparation. An introduction to the subject of foods; selection, preparation, and service; and the fundamental principles of nutrition. For students not electing Chemistry.

Prerequisites or parallel: ZP 322, Bac 200. Sophomore year; first term; 4 credits; 2 recitations; 2 three-hour laboratory periods.
Sara W. Prentiss

HS 204. Food Selection and Preparation. Continuation of HS 203.

Prerequisite: HS 203. Sophomore year; second term; 4 credits; 2 recitations; 2 three-hour laboratory periods.

HS 205†. Food Selection and Preparation. Continuation of HS 204.

Prerequisite: HS 204. Sophomore year; third term; 4 credits; 2 recitations; 2 three-hour laboratory periods. *Sara W. Prentiss*

HS 211*. Food Selection and Preparation. Study of foods in their scientific and economic aspects; selection, preparation, and service. Fundamental principles of nutrition.

Prerequisites: Ch 103, Ch 221 prerequisite or parallel. Sophomore year; first term; 4 credits; 2 recitations; 2 three-hour laboratory periods.
Amelia E. Burns, Bernice C. Wait

HS 212. Food Selection and Preparation. A continuation of HS 211.

Prerequisite: HS 211. (Ch 222 must precede or parallel this course.) Sophomore year; second or third term; 4 credits; 2 recitations; 2 three-hour laboratory periods.

Amelia E. Burns, Bernice C. Wait

HS 213†. Food Selection and Preparation. A continuation of HS 212.

Prerequisite: HS 212. Sophomore year; any term; 4 credits; 2 recitations; 2 three-hour laboratory periods.

Amelia E. Burns, Bernice C. Wait

HS 310. Food Economics. Marketing, cost in relation to food values and standards of living, in the planning, preparation, and serving of meals. A great variety of food materials is used and the more complicated processes of cooking are taught.

Prerequisite: HS 213 or HS 205. Junior year; any term; 3 credits; 1 lecture; 2 three-hour laboratory periods.

Jessamine C. Williams

*Students not having had high school training in Home Economics or its equivalent in home or trade experience will register in Section A.

†Home practice in food preparation is required of students who have completed HS 205 and HS 213, the character and amount of practice being arranged with the instructors in charge.

HS 320. Nutrition. A scientific study of nutrition in relation to health; digestive and metabolic processes and products; methods of investigation which have established the quantitative basis in dietetics and the standards which have been adopted.

Prerequisites: HS 213, ZP 321, Ch 222. Junior year; first or second term; 3 credits; 2 recitations; 1 three-hour laboratory period.

Eleanor R. Maclay

HS 321. Nutrition. A continuation of HS 320, and the application of these scientific principles in the nutrition of the individual and family group. Field problems in the nutrition of children and adults.

Prerequisite: HS 320. Junior year; second or third term; 3 credits; 2 recitations; 1 three-hour laboratory period.

Eleanor R. Maclay

HS 340. Food Selection and Preparation (for Men). A course for men who are planning and preparing their own meals or who are acting as managers of clubs.

Junior or senior year; second term; 1 credit; 1 three-hour laboratory period.

HS 350. Camp Cookery (for Men). Preparation of palatable and nutritious products from foods available in camps; outdoor food preparation involving the use of Dutch ovens, reflectors, and improvised camping utensils.

Junior or senior year; third term; 1 credit; 1 three-hour laboratory period.

HS 420. Diet in Disease. A study of diets for abnormal conditions. A preliminary course for students who wish to become hospital dietitians or nutrition specialists.

Prerequisite: HS 321. Senior year; third term; 3 credits; 2 lectures; 1 three-hour laboratory period.

Jessamine C. Williams

HS 435. Experimental Cookery. Individual problems. Each student selects some piece of work concerned with foods or related subjects. Oregon products often furnish material for these experiments.

Prerequisite: HS 213. Senior year; any term; 2 credits; 2 three-hour laboratory periods.

HS 691, 692, 693. Thesis and Graduate Study. Research problems for which the student is suited by previous training and ability. Assignment of problems by the professor in charge.

Graduate year; three terms; credits and hours to be arranged.

INSTITUTIONAL MANAGEMENT

Equipment. The new dormitory for women with its modern equipment and conveniences, an attractive tea-room with the latest institutional devices for work, and cafeteria facilities for instruction, permit of offering the highest type of training in institutional management, for which there is an increasingly great demand.

COURSES

IM 310. Institutional Cooking and Marketing. Application of the principles of cookery to the preparation of food in large quantity; planning and preparation of meals for the dining hall and cafeteria; standardization of formulas in relation to quantity, manipulation, and cost; use of modern equipment; study of problems involved in purchase of institutional supplies.

Prerequisite: HS 213 in Professional Curriculum or HS 205 in the General Curriculum. Required in Institutional Management; elective to others; junior or senior year; first term; 3 credits; 1 lecture; 2 three-hour laboratory periods.

Sibylla Hadwen, Elizabeth Flora

IM 330. Practice in Institutional Management. Work in office of Director of Dormitories; studies of business methods employed; practice work in bill checking, filing, making requisitions, etc.; inventories, including (1) food (stock taking), (2) linen, (3) china and small equipment, (4) furniture and large equipment; studies of all types of forms and records to be kept and various other phases of dormitory and cafeteria management.

Required in Institutional Management; senior year; second term; 3 credits; 1 lecture; 2 three-hour laboratory periods.

Sibylla Hadwen, Elizabeth Flora

IM 430. Tea-room Management. Training in various lines of management of tea-rooms, including plans, preparations, and service of luncheons to the public.

Prerequisite: HS 205 or 213 (except for students in one-year curriculum). Required in Institutional Management (third term); elective to others (any term); 3 credits; 1 lecture; 2 two-hour laboratory periods.

Sibylla Hadwen, Herta Vasanoja

IM 431. Advanced Institutional Management and Administration. Organization and administration of different types of institutions; service; wages, choosing and training employees; welfare work; salaries; labor; study of all types of public and private institutions.

IM 432. Practice in Advanced Institutional Management. Designed to give the advanced student practice in problems of institutional management under supervision; first six weeks in the tea-room and six weeks in the dining halls and the cafeteria.

Prerequisite: IM 330. Required in Institutional Management; elective to others; senior year; third term; 3 credits; 3 three-hour laboratory periods.

Sibylla Hadwen

IM 433. Cafeteria Management. This course is offered to meet the needs of the student who plans to teach and manage a school cafeteria. Large-quantity cookery; study of menu; general plan of cafeteria, decoration and equipment; management; organization; accounting; buying. Students receive practice in the actual handling of food and managing of all phases of the work in the College cafeteria.

Elective; senior year; third term; 3 credits; 1 lecture; 2 three-hour laboratory periods.

Required in Institutional Management; elective to others; senior year; second term; 2 credits; 2 lectures.

Sibylla Hadwen

School of Mines

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
CHARLES EDWARD NEWTON, E.M., Dean of the School of Mines.
RUTH HANNAH BRIGHTMAN, Secretary to the Dean.

DOUGLAS CLERMONT LIVINGSTON, B.S. (Mining Eng.), Professor of Geology.

JAMES HERVEY BATCHELLER, B.S. (Mining Eng.), Associate Professor of Mining Engineering.

LOUIS THOMAS ABELE, B.A., Instructor in Geology.

The curriculum in Mines is designed to give thorough training in the fundamentals of the science of Geology and the arts of Mining and Metallurgy, and to prepare for positions of responsibility in the industrial life of the country, particularly in the mining field. The curriculum is of such a comprehensive character that a graduate finds it of aid in varied employments. The opportunities which are open to a graduate of the School of Mines include such positions as assayer, chemist, or metallurgist at mines and smelters; members of staffs of the Government and state geological surveys; member of the staff of the Government Coast and Geodetic Survey; land or deputy mineral surveyor; draftsman and designer in engineering establishments; member of the engineering and geological staffs of mining, oil, and exploration companies and of railroads; and worker in the land-classification work of the Government forest service. Graduates may expect that after having reached the necessary maturity they will be competent to fill responsible positions in any branches of geology, mining, and metallurgy.

Curricula. A four-year curriculum, leading to the degree of Bachelor of Science in Mining Engineering, is offered by the School of Mines. Students showing ability are offered the opportunity and encouraged to take special work in that branch of the profession that most interests them, such as geology, mining, or metallurgy. Those emphasizing mining and metallurgy follow the regular curriculum, while those emphasizing geology follow a special curriculum as outlined below.

The first two years in the School of Mines are the same for all students. The work is intended to give the student a thorough knowledge of those studies basic to all branches of engineering;

namely, Mathematics, Physics, Chemistry, Mechanical Drawing, Plane Surveying, Shop Work, and courses having general cultural value.

Two months or more employment in industrial lines closely allied to the student's major is a prerequisite to graduation.

Equipment. The School of Mines occupies a commodious, three-story and basement building especially designed for housing the lecture rooms and laboratories devoted to Mining, Metallurgy, Ore Dressing, Geology, and closely allied subjects. The assaying and metallurgical laboratory occupies a room 30 feet by 60 feet on the first floor of the building, extending across the entire east end. It is amply lighted and is completely equipped with the necessary apparatus for conveniently and scientifically carrying on experimental metallurgical operations. A crushing and grinding laboratory and an ore-testing laboratory, completely equipped, occupy two rooms in the basement. On the second floor is located the mining drafting room, equipped for topographical drafting, mining and metallurgical design. The geology laboratories occupy the third floor of the Mines Building, and comprise the Geologic and Mining Museum, the mineralogic laboratory, and the petrologic laboratory. In the Museum are arranged collections of ores, minerals, and rocks from the important mining camps in Oregon. Besides these collections there are many attractive specimens of minerals, rocks, and fossils from numerous American localities. Geologic products are shown, such as samples of different clay wares and cement goods. In addition there is a large-scale relief map of the state. The geologic laboratories contain more than 12,000 specimens of ores, rocks, and minerals; rock slides for microscopic work; and geologic and topographic maps.

Miners' Club. The Miners' Club is a society composed of all students and faculty members of the School of Mines. All members of this organization are also members of a junior branch of the American Institute of Mining and Metallurgical Engineers. At the monthly meetings of the Club, addresses are made by prominent mining engineers, and papers descriptive of the summer work of the students are presented by the student members.

CURRICULA IN MINING ENGINEERING

(B.S. Degree)

Freshman Year

	Term		
	1st	2d	3d
General Chemistry (Ch 104, 105, 106)	5	5	5
Plane Trigonometry (Mth 111), Elementary Analysis (Mth 131, 132)	4	4	4
Linear Drawing and Lettering (ME 111), Elementary Mechanical Drawing (ME 112)	2	2	---
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Mechanical Drawing (ME 112)	---	---	2
Elements of Geology (G 101)	1	---	---
Elements of Mining (MiE 142)	---	1	---
Elements of Metallurgy (Met 163)	---	---	1
Gymnastics and Calisthenics (PEM 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
	$17\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$

Sophomore Year

Qualitative Analysis (Ch 232), Quantitative Analysis (Ch 244)	5	5	---
Differential Calculus (Mth 251), Integral Calculus (Mth 252)	4	4	---
Physics (Ph 221, 222, 223)	3	3	3
General Physics (Ph 224)	---	---	3
Plane Surveying (CE 121)	---	---	5
Crystallography, Blowpipe Analysis, and Determinative Mineralogy (G 211), Mineralogy (G 212)	4	4	---
Gymnastics and Calisthenics (PEM 211, 212, 213)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
Elective	---	---	2
	$18\frac{1}{2}$	$18\frac{1}{2}$	$15\frac{1}{2}$

Junior Year

Mechanics (MM 351, 352)	3	3	---
Lithology or Rock Study (G 311)	3	---	---
Structural Geology (G 312)	---	2	---
General Geology (G 301)	3	---	---
Mining Machinery and General Mining (MiE 343)	---	---	3
Geologic Surveying and Mapping (G 323)	---	---	3
Mine Surveying (MiE 353)	---	---	3
Assaying (Met 362)	---	4	---
Ore Dressing (Met 381, 382, 383)	3	3	3
Introduction to Economics (ES 391)	3	---	---
National Government (PS 301), or State and Local Government (PS 302)	---	3	---
¹ Electives	3	3	3
	18	18	15

Senior Year

Mining Methods (MiE 441), Mining Engineering (MiE 442), Mine Management (MiE 443)	4	4	3
Metallurgy of Gold and Silver (Met 462), Metallurgy of Copper, Lead, and Zinc (Met 463)	---	4	4
Business Organization and Management (FA 381)	---	---	3
Metallurgical Laboratory (Met 491, 492)	3	3	---
Metallurgy of Iron (Met 473)	---	---	1
General Metallurgy (Met 461)	4	---	---
Economic Geology (G 431, 432, 433)	3	3	3
¹ Electives	3	3	3
	17	17	17

¹Suggested electives: Materials of Engineering (MM 311), Hydraulics (CM 444), Steam Machinery (ME 331), Historical Geology (G 302).

PROPOSED ELECTIVES

Public Speaking.	Industrial Inorganic Chemistry.
Industrial Journalism.	Industrial Organic Chemistry.
Money and Banking.	Electro-chemical Industries.
Modern Languages.	Forest Mapping.
History.	Contracts and Specifications.
Library Practice.	Engineering Location, Earthworks.
English.	Machine Design.
Industrial Arts courses (woodwork, machine work, automobile mechan- ics, blacksmithing, plumbing).	Topographic Surveying.
Steam Power Plants.	Advanced Quantitative Analysis.
Masonry and Foundations.	Metallography and Pyrometry.
	Other courses offered in the School of Mines.

GEOLOGY OPTION

The following option is suggested for those students desiring to emphasize the geologic phases of the mining profession.

Freshman and Sophomore Years

Identical with those of the regular curriculum in Mining Engineering, except that nine credits of foreign language may be substituted for eight credits of Calculus and one credit of Chemistry of Fuels.

Junior Year

	Term		
	1st	2d	3d
Lithology or Rock Study (G 311)	3	---	---
Structural Geology (G 312)	---	3	---
Geologic Surveying and Mapping (G 323)	---	---	3
General Geology (G 301)	3	---	---
Historical Geology (G 302)	---	3	---
Mine Surveying (MiE 353)	---	---	3
Introduction to Economics (ES 391)	3	---	---
National Government (PS 301) or State and Local Government (PS 302)	---	3	---
Modern Language or History	3	3	3
Botany or Zoology	3	3	---
Business Administration	---	---	3
Electives	3	3	6
	18	18	18

Senior Year

Economic Geology (G 431, 432, 433).....	3	3	3
Mining Methods (MiE 441)	4	---	---
General Metallurgy (Met 461)	---	4	---
Sociology	---	---	4
Geology, Biological Science, or Physics	6	6	6
Electives	3	3	3
	16	16	16

GEOLOGY

The courses in Geology are designed primarily to give the student of Mining Engineering a sound knowledge of the principles of the many branches of the science, and a thorough training in geologic technique having a direct bearing upon the mining profession. Advanced technical courses in Geology are open to qualified students. Several geologic courses are especially designed for students in Agriculture, Civil Engineering, and Forestry.

COURSES

G 100. Growth of Scientific Knowledge. A course designed to give a bird's-eye view of the different sciences and the manner in which they were developed. It takes up the subject from the historical point of view and describes the growth of our knowledge regarding matter, the universe, the earth, development of the earth and life upon it; evolution, and the effect of these discoveries upon human thought. It shows the relationship that exists between all of the sciences and is a brief introductory course to the specialized work of the individual and separate sciences. Related reading assignments.

Elective to all students; third term; 3 credits; 3 lectures.

D. C. Livingston

G 101. Elements of Geology. In order to have the simplest conception of the mining profession, one must have an elementary knowledge of Geology. The aim of this course is to give a general outline of the fundamentals of Geology and to show their correct application to mining engineering.

Required in Mines; elective to others; freshman year; first term; 1 credit; 1 lecture.

C. E. Newton

G 211. Crystallography, Blowpipe Analysis, and Determinative Mineralogy. The underlying principles of crystal form, chemical and blowpipe methods, physical and optical properties of minerals, and the practical use of these principles in mineral determination.

Required in Mines; sophomore year; first term; 4 credits; 2 recitations; 3 two-hour laboratory periods. Fee \$4.00. Deposit \$1.50.

D. C. Livingston, L. T. Abele

G 212. Mineralogy. A continuation of G 211, including sight recognition of a large number of important economic and common rock-forming minerals by means of simple physical tests; microscopic mineralogy which involves the recognition of rock-forming

minerals by means of their optical characters and includes index of refraction with immersion media. Some time is also spent on the occurrence and origin of minerals.

Prerequisite: G 211. Required in Mines; sophomore year; second term; 4 credits; 1 recitation; 4 two-hour laboratory periods. Fee \$2.00. Deposit \$1.50. *D. C. Livingston, L. T. Abele*

G 214. **Crystallography.** Briefer course than G 211. Chiefly designed for work in Chemical Engineering and Soils.

Prerequisite: General Chemistry. Elective; first term; 3 credits; 1 recitation; 3 two-hour laboratory periods. Fee \$2.50. Deposit \$1.50. *J. H. Batcheller*

G 215. **Mineralogy.** Topics covered in G 212 adapted to the needs of students in Chemical Engineering and Soils.

Elective to all students; second term; 3 credits; 1 recitation; 3 two-hour laboratory periods. Fee \$2.00. Deposit \$1.50.

J. H. Batcheller

G 301. **General Geology.** Principles of geology, including constitution of the earth, rock-forming minerals; rocks; rock weathering; work of wind, streams, and glaciers; underground water; work of the ocean; lakes; volcanism and earth movements; brief summary of the historical geology of North America. General Chemistry is recommended as a prerequisite though not required.

Required in Mines; elective to others; junior year; first term; 3 credits; 3 recitations. *D. C. Livingston*

G 301a. **General Geology.** Similar to G 301.

Required in Civil Engineering; elective to others; senior year; first term; 3 credits; 3 recitations; 1 two-hour laboratory period. Fee \$1.00. *D. C. Livingston, L. T. Abele*

G 301b. **General Geology.** Similar to G 301.

Elective to all students; third term; 3 credits; 3 recitations.

D. C. Livingston

G 301c. **General Geology.** Same as G 301, but especially arranged for students in Agriculture, Landscape Gardening, and Forestry.

Required in Landscape Gardening (sophomore year); elective to others; first or third term; 3 credits; 3 recitations; 1 two-hour laboratory period. Fee \$1.00. *D. C. Livingston, L. T. Abele*

G 302. **Historical Geology.** Origin and history of the earth and the evolution of plants and animals as disclosed by fossils in the rocks; emphasis upon the growth and development of the

North American continent and the sequence of events up to the present time.

Elective to all students; second term; 3 credits; 3 lectures.

D. C. Livingston

G 302a. Historical Geology. Similar to G 302.

Prerequisite: laboratory work in G 301a. Elective; second term; 3 credits; 3 recitations; 1 two-hour laboratory period.

D. C. Livingston, L. T. Abele

G 311. Lithology or Rock Study. This course is intended to familiarize the student with the characteristics of the commoner rocks so that he may identify them in the field. Microscopic examination of thin sections of rock to bring out the essential features of rocks which a study of hand specimens alone does not effect; origin, occurrence, and alteration of rocks studied in considerable detail.

Prerequisites: G 212, 301. Required in Mines; junior year; first term; 3 credits; 2 lectures; 2 two-hour laboratory periods. Fee \$1.00.

D. C. Livingston

G 312. Structural Geology. This course is a study of the broader features of the earth's surface and underlying structures of the rocks, including topographic forms, the making of structure sections from surface geology, the influencing of folding, the solution of fault problems, and the use of structure contours in the location of coal beds and oil-bearing strata.

Prerequisite: G 311. Required in Mines; junior year; second term; 2 credits; 1 lecture; 2 two-hour laboratory periods. Fee \$1.00.

D. C. Livingston, L. T. Abele

G 323. Geologic Surveying and Mapping. A study of the principles and methods of geologic surveying and mapping and their application to field work. The student is assigned a small area and is required to make a geologic map and report, based upon the results of his field work. A two-week trip is made to a mining locality showing a variety of geologic features.

Prerequisite: G 312. Required in Mines; junior year; third term; 3 credits; 1 recitation; 6 hours in field and laboratory. Fee \$2.00.

D. C. Livingston, J. H. Batcheller

G 413. Petrography. A more advanced course in Petrology. The optical properties of the rock-forming minerals and the characteristics of the principal rock types are studied with the aid of thin sections and polarizing microscope. Type collections with their corresponding rock sections are available, and the student has the opportunity to supplement field determinations with the exact knowledge gained through the use of microscope.

Prerequisites: G 311, 312. Elective; third term; 3 credits; 1 recitation; 3 two-hour laboratory periods. Fee \$3.00.

D. C. Livingston

G 422. Interpretation of Geologic and Topographic Maps. Study of the representation of geologic and topographic data; interpretation of geologic maps and cross-sections of topographic maps; methods of plotting geologic data on engineering maps; a large number of Government and other geologic and topographic maps covering varied regions of the United States studied in detail.

Elective in Mines, Engineering, and Forestry; junior or senior year; second term; 2 credits; 2 laboratory periods. Fee \$1.00.

D. C. Livingston, J. H. Batcheller

G 431. Economic Geology. A study of the many and various factors pertaining to the application of geology to industry. Geologic occurrence of coal, petroleum, gas, clay, building stone, ore deposits, and the like is carefully studied and particular attention is given to those characteristics affecting economic value.

Required in Mines; senior year; first term; 3 credits; 3 recitations.

D. C. Livingston

G 432. Economic Geology. Continuation of G 431. The principles of ore deposition are taken up in detail.

Prerequisite: G 431. Required in Mines; senior year; second term; 3 credits; 3 recitations.

D. C. Livingston

G 433. Economic Geology. Various types of deposits that occur in important mining camps are discussed, and written abstracts are required from literature bearing on the subject. Considerable importance is attached to the laboratory work, which consists of mineralogic and petrologic study of rocks and ores from type deposits. A certain amount of time is devoted to a discussion of field methods, mine examinations, and reports.

Prerequisite: G 432. Required in Mines; senior year; third term; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$1.00.

D. C. Livingston

G 433a. Economic Geology. Similar to G 433 arranged for students who have completed course 301a, b, or c.

Third term; 3 credits; 3 recitations; 1 two-hour laboratory period.

D. C. Livingston, L. T. Abele

G 611. Geology of Igneous Rocks. A course dealing with the origin of igneous rock bodies and designed for graduate or advanced students. Such subjects as magmatic differentiation, the mechanism of intrusive and extrusive action, are discussed in detail,

and special attention is given to those subjects that have an important technical bearing, such as contact metamorphism, magmatic waters, gaseous emanations, etc.

Prerequisite: G 413. Elective; senior year; first term; 2 credits; 2 recitations. *D. C. Livingston*

G 622. **Oil Geology.** A course in the geology of petroleum consisting of a study of the origin, geologic occurrence, geologic structure and distribution of deposits of petroleum and natural gas, with special reference to the oil and gas fields of the United States, Mexico, and South America. Methods of exploring for oil, methods of mapping geologic structure, and methods of recording and filing geologic data bearing upon the geology of oil and gas, are studied.

Prerequisite: G 312. Elective; senior year; second term; 2 credits; 2 lectures or recitations; 1 laboratory period.

D. C. Livingston

G 632. **Problems in Economic Geology.** Problems in mining and field geology are worked out by the student in the laboratory and drafting room. Geologic, topographic, and mine maps are used, and many structural problems are studied, with special regard to their application in the development of mineral deposits.

Prerequisite: G 431. Elective; senior year; second term; 2 credits; 2 laboratory periods. Fee \$1.00. *D. C. Livingston*

METALLURGY

The aim of the various courses in Metallurgy is to give the student a broad and general knowledge of the methods of treating ores, metals, and other products of the mineral industry, including the processes of assaying, amalgamation, cyanidation; general milling methods, such as crushing, grinding, and concentration; and the smelting of ores for iron, copper, lead, and zinc, and the minor metals, and their refining.

COURSES

Met 163. **Elements of Metallurgy.** An introductory course in Metallurgy; various phases of the treatment of ores; use of fuels; the production of metals.

Required in Mines; elective to others; freshman year; third term; 1 credit; 1 lecture. *C. E. Newton*

Met 362. **Assaying.** The quantitative determination of the constituents of reagents; crushing, sampling and assaying of ores; fluxes and general metallurgical products.

Required in Mines; junior year; second term; 4 credits; 1 recitation; 3 four-hour laboratory periods. Deposit \$15.00.

C. E. Newton

Met 381, 382, 383. **Ore Dressing.** The principles of breaking, grinding, concentrating; general treatment of ores by various processes.

Required in Mines; junior year; three terms; 3 credits each term; 3 recitations.

C. E. Newton

Met 461. **General Metallurgy.** Application of the laws of Chemistry and Physics to metals and alloys; study of fuels, refractory materials, metals and alloys; furnaces and the principles of smelting.

Required in Mines; senior year; first or second term; 4 credits; 4 recitations.

C. E. Newton

Met 462. **Metallurgy of Gold and Silver.** Study of the smelting, amalgamation, cyanidation, and other processes for the production of gold and silver from their ores.

Required in Mines; senior year; second term; 4 credits; 4 recitations.

C. E. Newton

Met 463. **Metallurgy of Copper, Lead, and Zinc.** Study of the method of producing and refining; the economic conditions affecting the production of common non-ferrous metals.

Required in Mines; senior year; third term; 4 credits; 4 recitations.

C. E. Newton

Met 473. **Metallurgy of Iron.** Study of the smelting of iron from its ores; the production of cast iron and wrought iron and the general varieties of steel.

Required in Mines; senior year; third term; 1 credit; 1 recitation.

C. E. Newton

Met 491, 492. **Metallurgical Laboratory.** Laboratory testing in connection with Met 462, Metallurgy of Gold and Silver; Met 463, Metallurgy of Copper, Lead, and Zinc; and Met 381, 382, 383, Ore Dressing.

Required in Mines; senior year; first and second terms; 3 credits each term; 1 lecture; 3 three-hour laboratory periods. Fee \$5.00 each term. Deposit \$5.00 each term.

C. E. Newton, J. H. Batcheller

Met 651. **Assaying.** The quantitative determination of the constituents of ores, metallurgical products, and fuels.

Elective in Mines; junior year; third term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$5.00. Deposit \$5.00.

C. E. Newton

Met 661. **Metallurgy of the Minor Metals.** The metallurgy of mercury, tin, aluminum, nickel, arsenic, and antimony; study of the methods of production and the uses in the arts.

Elective; senior year; first term; 2 credits; 2 recitations.

C. E. Newton

Met 662. **Metallurgical Design.** Study of plant flow sheets; designing of apparatus for metallurgical operations; working up of flow sheets for milling, smelting, and leaching operations.

Elective; senior year; second term; 2 credits; 2 laboratory periods. Fee \$2.00.

C. E. Newton

Met 663. **Electrometallurgy.** The principles, processes, and apparatus involved in using electrical energy for the smelting and refining of ores and metals.

Elective; senior year; third term; 2 credits; 2 recitations.

C. E. Newton

MINING ENGINEERING

The courses in Mining Engineering are intended to equip the student with thorough knowledge of the basic principles of the art of mining which are essential in development of mineral properties, design and construction of mine plants, and management of mines.

COURSES

MiE 142. **Elements of Mining.** An introductory course designed to give the main features of mining, the aim being to summarize the phases that the student takes up in detail later in his work, to acquaint him early in his course with the life, the work, and the field of the profession.

Required in Mines; elective to others; freshman year; second term; 1 credit; 1 lecture.

C. E. Newton

MiE 143. **Explosives: Their Properties and Use.** This course offers an opportunity to students in Agriculture, Forestry, Civil Engineering, or others, to learn the principles of explosive action and to study the properties of explosives. Proper use of common high explosives; waste and danger of improper use; emphasis upon the various methods of using explosives as applied to farming, road building, etc.; actual field practice in loading and firing; blasting with the aid of electricity.

Prerequisite: General Chemistry. Elective; junior year; third term; 2 credits; 1 lecture each week; 4 three-hour laboratory periods during the term. Fee \$1.00.

J. H. Batcheller

MiE 243. Excavation, Explosives, and Blasting. Methods and cost of earth and rock excavation, tunneling, and shaft sinking; study of explosives used in mining and excavation work; methods of handling and storing explosives; methods of blasting.

Elective; sophomore year; third term; 3 credits; 3 lectures.

J. H. Batcheller

MiE 343. Mining Machinery and General Mining. A study of mining machinery and equipment used in general mining and prospecting work; brief discussions and illustrations of general mining operations, including metal, coal, and oil.

Required in Mines; junior year; third term; 3 credits; 3 recitations.

J. H. Batcheller

MiE 353. Mine Surveying. Study of the methods of surveying as used on surface and underground in connection with mining operations; United States land subdivision and mining laws; claim surveys and locations; patent work; topographic surveys and maps; underground methods of traversing; stope measurement; connections; a field trip during the last two weeks of the term to some mine in the vicinity of the College.

Required in Mines; junior year; third term; 3 credits; 2 recitations; 1 laboratory period. Fee \$2.00.

J. H. Batcheller

MiE 441. Mining Methods. A comprehensive study and comparison of all systems of mining; a detailed study of the advantages and disadvantages of various stoping methods, methods of development, and of carrying on simultaneously developing and producing.

Required in Mines; senior year; first term; 4 credits; 4 recitations.

J. H. Batcheller

MiE 442. Mining Engineering. With the aid of technical records a study is made of the control and coordination of all mine operations, such as developing, stoping, transportation, milling of ore, etc. Included also is a study of mining law, problems of handling labor, production of power, marketing of products, and economic factors affecting mining.

Prerequisite: MiE 441. Required in Mines; senior year; second term; 4 credits; 4 recitations.

J. H. Batcheller

MiE 443. Mine Management. A study of the operating conditions from an economic point of view, including an examination and estimation of ore reserves and an analysis of operating cost data, supplemented by mine problems worked out in the drafting room.

Prerequisite: MiE 442. Required in Mines; senior year; third term; 3 credits; 1 lecture; 3 three-hour laboratory periods. Fee \$2.00.

J. H. Batcheller

MiE 641. **Mine Economics and Mining Law.** Study of the costs of mining; methods of mine accounting and cost keeping; mining laws of the United States, Canada, and Mexico.

Elective; senior year; first term; 3 credits; 3 recitations.

J. H. Batcheller

MiE 642. **Mine and Power Equipment.** Study of surface and underground equipment for mines, including haulage systems, hoists, compressors, drills, pumps, etc.; discussion of the sources of power, water, hydroelectric, steam, gas, and compressed air; problems illustrating their application to mining methods.

Elective; senior year; second term; 3 credits; 3 recitations.

J. H. Batcheller

MiE 643. **Mine Plant Design.** The student designs and details plans and specifications for mine equipment to meet the requirements of a hypothetical mine.

Elective; senior year; third term; 2 credits; 2 three-hour laboratory periods. Fee \$2.00.

J. H. Batcheller

School of Pharmacy

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.

ADOLPH ZIEFLE, Ph.C., M.S., Dean of the School of Pharmacy; Professor of Pharmacy.

FRANCOIS ARCHIBALD GILFILLAN, Ph.D., Associate Professor of Pharmacy and Materia Medica.

JUSTIN LAWRENCE POWERS, Ph.C., B.S., Assistant Professor of Pharmacy.

LYNN BLAIR HOPKINS, Ph.G., B.S., Assistant in Pharmacy.

ARTHUR BOONE, Teaching Fellow in Pharmacy.

GLADYS IRENE JOHNSON, Secretary to the Dean.

The School of Pharmacy was established in 1898 by the Board of Regents of the College upon petition of the druggists of the state to meet the growing demand for thorough practical and theoretical training in Pharmacy and related branches. From its inception, it has grown steadily and has always had a place in the front rank of the profession.

It is the aim of the School of Pharmacy to prepare students for the intelligent practice of all branches of Pharmacy. Its equipment, methods of instruction, courses of study, and other resources are arranged to meet the demands of the present day. Requirements for entrance and graduation exceed those of the Oregon State Pharmacy Law.

Class instruction, entrance requirements, and scientific standards are the same as in the other schools of the College, as well as in other Class A schools and colleges of pharmacy. Students share all of the advantages and enjoy the spirit of a great educational institution.

Curricula. The School of Pharmacy offers a four-year curriculum leading to the degree of Bachelor of Science in Pharmacy, a three-year curriculum leading to the degree of Pharmaceutical Chemist, and a three-year pre-Medical curriculum, the first two years of which qualify for clear entrance to medical schools having a two-year pre-Medical requirement.

Purpose of Training. Consistent endeavor has been made to provide well-balanced courses that will prepare students not only for practical drug-store work but for a variety of positions in pharmaceutical, analytical, and medical chemistry. Students are trained

not only in technique, power of observation, and the principles of pharmacy, but also in resourcefulness, initiative, and individual responsibility.

Standard of Work. All work offered in the School of Pharmacy meets the highest requirements of pharmaceutical instruction in this country. The School is a member of the American Conference of Pharmaceutical Faculties, and its curricula are registered by the New York Board of Higher Education. The facilities for theoretical and practical instruction are all that could be desired. Realizing the broad training that students receive from laboratory work, this has been made a special feature of the School. Diplomas, as well as the work of students in this School, are recognized by all state boards of pharmacy requiring attendance in a school of pharmacy as a prerequisite for examination and registration.

American Conference of Pharmaceutical Faculties. The purpose of this Conference is to promote the interest of pharmaceutical instruction in the United States. Institutions holding membership must maintain certain minimum requirements for entrance and graduation. The influence of the Conference has been so great that many states either by law or by ruling of the state board of pharmacy recognize its standards.

Methods of Instruction. Lecture periods are fifty minutes each, laboratory periods two or three hours, depending upon the character of the work. Courses continue through the regular college year of nine months. As a rule, students spend approximately three-fourths of their time in lecture and laboratory work.

Requirements of the Pharmaceutical Profession. Public sentiment demands high requirements for the practice of Pharmacy through the enactment of stringent state and Federal laws. It is now a necessity that pharmacists have a scientific training such as cannot be obtained by merely working in a drug store. The Oregon State Board of Pharmacy, recognizing the importance of supervised theoretical and practical instruction as a means of insuring accurate preparation and dispensing of medicines, now requires college training as a prerequisite for examination and registration.

Oregon Law Relating to the Practice of Pharmacy. The Oregon Pharmacy Law is enforced by the Oregon State Board of Pharmacy. This Board recognizes two classes of pharmacists; namely, registered pharmacists and registered assistant pharmacists. The state law outlines the scope and duties of each class

with regard to the dispensing of prescriptions, sale of poisons, and the manufacture of medicines. Before a candidate is eligible to take the state pharmacy examination either as registered pharmacist or as registered assistant pharmacist he must be eighteen years of age, or over, and have had a definite amount of theoretical and practical training. A registered pharmacist can operate a drug store, compound medicinal preparations, dispense prescriptions, sell poisons, and train assistant registered pharmacists. A registered assistant pharmacist must meet certain requirements of the State Board, including the passing of an examination. His duties are to assist the registered pharmacist, but he cannot compound medicines, operate a drug store, sell poisons, or dispense prescriptions. A resumé of the Oregon Pharmacy Law passed in 1921 and amended in 1925 is as follows:

"Registered Assistant Pharmacist. A candidate for examination as a Registered Assistant Pharmacist must be over eighteen years of age, and have had three years' experience in a pharmacy where the prescriptions of physicians are compounded and dispensed; provided, that the time actually spent in attendance at a college accredited by the Oregon Board of Pharmacy shall be considered equivalent to the same period of practical experience, but in no case shall more than two years be credited for college attendance.

"Registered Pharmacist. Beginning July 1, 1925, all candidates for examination as Registered Pharmacists must be graduates of a college of pharmacy accredited by the Oregon Board of Pharmacy; provided, further, that the Board of Pharmacy may issue a certificate of registration to any person residing in this state and who has had at least twenty years' experience under the supervision of a registered Pharmacist in a pharmacy where prescriptions of physicians are compounded and who shall satisfy said Board of his or her competent qualification and skill as a pharmacist."

Eligibility for Examination. Graduates from the three- and four-year curricula in Pharmacy are eligible to examination by the Oregon State Board of Pharmacy. Those graduates, however, who can not present evidence of having had two years' practical drug store experience, are examined only in Chemistry, Materia Medica, Pharmacy and Pharmaceutical Calculations. After having had two years' drug-store experience they are examined in identification of drug specimens and prescription compounding. If they pass in all subjects they are licensed as registered pharmacists. Graduates who have had two years' experience are examined in all required subjects.

Reciprocity. Since the Oregon Board of Pharmacy is a member of the National Association of State Boards of Pharmacy, students who are registered by this Board are privileged to reciprocate with forty-four other states in the Union, without further examination.

Demand For Graduates. The demand for the thoroughly trained pharmacist was never so great as at the present time. The demand, however, is for those having business ability, industry, integrity, and a thorough pharmaceutical education. Because of the great responsibility of the profession of pharmacy, in no line of work is expert knowledge so necessary.

Opportunity For Graduates. The degree curriculum in Pharmacy provides for such varied and extensive training that graduates can take up several different lines of work. They can matriculate in any standard school or college of medicine without condition; they can qualify as analytical chemists, prescription dispensers, bacteriologists, traveling salesmen, manufacturing pharmacists and chemists, science instructors in high schools and colleges, food and drug chemists and inspectors, physicians' assistants, and in other positions requiring a knowledge of chemistry, medicine, and pharmacy. Those graduates who have had good experience in practical drug-store work are in demand as managers of drug stores.

Pharmacy as a Profession for Women. There is no field of work that offers more desirable opportunities for women than Pharmacy. The work is clean, pleasant, agreeable, and women are peculiarly adapted to it. The technical work of manufacturing and dispensing drugs involves the traits of neatness and accuracy that, generally speaking, are more predominant in women than in men. In store arrangement, window trimming, and other work requiring a knowledge of color harmony and display, a woman is naturally more adept than a man. More than seventy-five percent of all drugs and druggists' sundries are purchased by women, and it is natural that those patrons would prefer to deal with women.

Correspondence. Inquiries regarding the School of Pharmacy may be addressed to the Dean. Students desiring to enter will be provided with proper blanks for filing credentials. These may be obtained from the Registrar's office.

Equipment. The new Pharmacy Building provides many new and modern facilities, including a model drug store, a complete sign-card and window-trimming department, special laboratories, museum, library and study room. All laboratories and lecture rooms are excellently equipped with all apparatus necessary for practical pharmaceutical instruction. Students have individual desks which are supplied with the materials necessary for the specific course. Students can borrow as much additional apparatus as they may need from the three Pharmacy stock-rooms. In order

to conserve students' time in laboratory courses, all stock is placed on side shelves. By this means students can repeat an experiment as many times as are necessary to get accurate results.

In addition to the usual permanent fixtures and apparatus for individual students, the School is supplied with a number of pieces of special apparatus such as pharmaceutical stills, tablet and pill machines, filter presses, hand and power drug mills, special percolators, gas and electric drying ovens, and such other apparatus as is necessary for modern pharmaceutical instruction. The pharmacognosy room contains several hundred samples of crude drugs, official and unofficial preparations, and active principles of drugs used for study and identification purposes. There is also a collection of authentic crude drugs and their preparation donated by Eli Lilly company. This collection is used as a standard for all new supplies of drugs received. The special laboratory for commercial pharmacy is very well equipped for sign-card painting and display material. In addition to brushes, pens, paints, and other apparatus used in show-card work, each desk is provided with an air-brush outfit useful in shading of letters and drawings.

Entrance Without Drug Store Experience. Students are not required to have had drug store experience upon entering the College. Such experience is very desirable, however, and students are advised to acquire one or preferably two years before taking up the courses in Pharmacy. No secondary or advanced credits are allowed for drug store experience, but the State Board of Pharmacy requires a definite amount of practical experience before registration can be granted.

Four-year Curriculum. This curriculum is academic and professional in nature and is therefore the most satisfactory one to elect. Upon completion of the required subjects, students are granted the degree of Bachelor of Science in Pharmacy. This curriculum includes all professional work of the three-year curriculum as well as all pre-Medical subjects, preparing for clear entrance at any Class A medical school. Graduates of this curriculum are eligible to take the examinations of any state board of pharmacy, and are prepared for any position requiring a knowledge of drugs and chemicals. Aside from a thorough training in Pharmacy and Chemistry, students in this curriculum are also instructed in Bacteriology, Physiology and Zoology, Physics, English, Modern Languages, Pharmaceutical Botany, Business Law, Economics, Business Administration, and Military Science and Tactics.

Three-year Curriculum. This curriculum leads to the degree of Pharmaceutical Chemist and is offered to meet the demand of

many students desiring to prepare for special lines of work, such as commercial chemists, food and drug inspectors and analysts, or clinical chemists for physicians. Although the three-year curriculum includes many of the basic pre-Medical subjects it does not qualify students for clear entrance into standard medical schools. Graduates of this curriculum must complete all required pre-Medical subjects before they are eligible to entrance at a Class A medical school. In certain instances they may petition for the degree of Bachelor of Science in Pharmacy after they have completed certain courses in the medical school.

Pre-Medical Curriculum. The School of Pharmacy offers a Class A pre-Medical curriculum which does not lead to graduation, nor does it qualify students for examination by a state board of pharmacy. The curriculum was outlined with the assistance of prominent medical educators; it is accredited by the Northwest Association of Secondary and higher Schools and is listed by the American Medical Association as a standard pre-Medical curriculum. Completion of the first two years qualifies students for clear entrance into medical schools requiring two years pre-Medical training, and completion of the entire curriculum qualifies for clear entrance to those schools requiring three years.

Students preparing for entrance into medical or dental schools will find that the fundamental courses required are given to advantage in the School of Pharmacy. Graduates declare that their pharmaceutical training has been of great value to them in their medical course but more especially in their work as internes and in general practice. Graduates in Pharmacy are also enabled to work a part of their way through a medical course by acting as relief clerks in drug stores.

In order to be eligible to clear entrance into any Class A medical school, students must present evidence of graduation from an accredited four-year high school, or the equivalent of fifteen high school units, and the completion of two or three years of college work made up of courses in Chemistry, Zoology, Physiology, Physics, Modern Languages, Economics, Political Science, English, and cultural subjects. The length of the course is regulated by each medical school. All schools of medicine contemplate requiring three years of pre-Medical training; therefore, a student beginning his pre-Medical course in the college year 1925-26 should plan on a three-year course.

It is not necessary that a student graduate from a degree curriculum to be eligible to enter a medical school. All that is required is a transcript showing the completion of certain courses as

outlined by the Council on Medical Education of the American Medical Association.

The Oregon State Agricultural College offers instruction in all sciences and maintains the largest scientific laboratories in the state. These laboratories, together with the adequate facilities for thorough instruction, make the institution an ideal place for pre-Medical training.

In addition to the regular instruction in pre-Medical subjects, the School of Pharmacy offers to pre-Medical students training in the compounding and dispensing of drugs. This is an advantage to students in medicine, as they become more or less familiar with remedies and prescriptions before beginning their medical courses.

Requirements for Graduation. The degree of Bachelor of Science in Pharmacy is conferred upon those who have satisfactorily completed the subjects as outlined in the four-year curriculum. This in the aggregate comprises 192 credits of collegiate work in the case of women, and 207 in the case of men, of which latter 12 are taken in Military Science and Tactics.

The degree of Pharmaceutical Chemist is conferred upon those who have satisfactorily completed as outlined the subjects of the three-year curriculum. This in the aggregate comprises 144 credits of collegiate work in the case of women, and 155 in the case of men, of which latter 12 are in Military Science and Tactics.

FOUR-YEAR CURRICULUM IN PHARMACY

(*B.S. Degree*)

	Term		
	1st	2d	3d
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 104, 105, 106)	5	5	5
General Zoology (ZP 101, 102, 103)	3	3	3
Pharmaceutical Botany (Bot 107, 108, 109)	3	3	3
Theoretical Pharmacy (Phr 111, 112, 113)	1	1	2
Gymnastics and Calisthenics (PEm 211, 212, 213) (Men)	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Gymnastics (PEw 111, 112, 113) (Women)	(1)	(1)	(1)
Social Ethics (PEw 121), Hygiene (PEw 122) (Women)	(1)	(1)	---
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	18 $\frac{1}{2}$

*As one year of college Physics is required by all medical schools for entrance, it is suggested that all students pursuing this curriculum arrange to elect Physics (Ph 121, 122, 123) during their freshman year. In addition, medical schools require a reading knowledge of French or German. To meet this requirement, it is necessary to have the equivalent of two years college credit in one of the languages.

	Term		
	1st	2d	3d
Sophomore Year			
Organic Chemistry (Ch 226, 227)	5	5	
Quantitative Analysis (Ch 244)			5
Mammalian Anatomy (ZP 211, 212, 213)	3	3	3
Commercial Pharmacy I (Phr 221)	2		
German or French	3	3	3
Introduction to Economics (ES 391)		3	
Business and Rural Law (PS 163)			3
Principles of Dietetics (HS 200) (Women), or elective (Men)	1		
Gymnastics and Calisthenics (PEM 111, 112, 113) (Men)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Gymnastics (PEW 211, 212, 213) (Women)	(1)	(1)	(1)
Military Science and Tactics	2	2	2
	<hr/>	<hr/>	<hr/>
Junior Year			
Retail Selling (FA 141)	3		
General Bacteriology (Bac 204)	3		
Pathogenic Bacteriology (Bac 332)		3	
Immunity and Serum Therapy (Bac 333)			3
Practical Public Speaking I (PSP 254)	3		
Retail Advertising (FA 142)		3	
Elementary Psychology (Psy 301)			3
Practical Pharmacy (Phr 333)		3	
Pharmaceutical Preparations (Phr 343)		3	
Pharmacognosy (Phr 351, 352)	2	4	
Inorganic Pharmacy (Phr 353)			3
Natural Products and Drug Principles (Phr 334)	3		
Pharmacopoeial Testing (Phr 363)			3
Pharmaceutical Calculations (Phr 321)			2
Electives	3	2*	3
	<hr/>	<hr/>	<hr/>
	17	18	17
Senior Year			
Materia Medica (Phr 451, 452, 453)	3	3	3
U. S. Pharmacopoeia and National Formulary (Phr 431, 432, 433)	3	3	3
Food and Drug Analysis (Ch 377)		3	
Prescription Lectures (Phr 461), Prescription Incompatibilities (Phr 462), Prescription Compounding (Phr 463)	4	4	3
Manufacturing Pharmacy (Phr 441)	3		
Physiological Chemistry (Ch 462)			3
Electives	5	4	5
	<hr/>	<hr/>	<hr/>
	18	17	17

THREE-YEAR CURRICULUM IN PHARMACY

(Ph.C. Degree)

	Term		
	1st	2d	3d
First Year			
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 104, 105, 106)	5	5	5
General Zoology (ZP 101, 102, 103)	3	3	3
General Physics (Ph 121, 122, 123)	4	4	4
Theoretical Pharmacy (Phr 111, 112, 113)	1	1	2
Gymnastics and Calisthenics (PEM 111, 112, 113)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Military Science and Tactics	2	2	2
	<hr/>	<hr/>	<hr/>
	18 $\frac{1}{2}$	18 $\frac{1}{2}$	19 $\frac{1}{2}$

*In cases of students electing Military Science and Tactics (3 credits each term), one of the required courses is pursued another term.

¹Pharmaceutic Botany (Bot 107, 108, 109) may be substituted for General Physics. Two years of either German or French is required for entrance into medical schools.

Second Year

	Term		
	1st	2d	3d
Organic Chemistry (Ch 226, 227)	5	5	---
Mammalian Anatomy (ZP 211, 212, 213)	3	3	3
Practical Pharmacy (Phr 333)	3	---	---
Pharmacognosy (Phr 351, 352)	2	4	---
Inorganic Pharmacy (Phr 353)	---	---	3
German or French	3	3	3
Pharmaceutical Preparations (Phr 343)	---	---	3
Pharmaceutical Calculations (Phr 321)	---	---	2
Economics, Sociology, Psychology, or Political Science	---	---	3
Gymnastics and Calisthenics (PEm 211, 212, 213)	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics	2	2	2
	18 $\frac{1}{2}$	17 $\frac{1}{2}$	19 $\frac{1}{2}$

Third Year

General Bacteriology (Bac 204)	3	---	---
Pathogenic Bacteriology (Bac 332), Immunity and Serum Therapy (Bac 333)	---	3	3
Materia Medica (Phr 451, 452, 453)	3	3	3
U. S. Pharmacopoeia and National Formulary (Phr 431, 432, 433)	3	3	3
Prescription Lectures (Phr 461), Prescription Incompatibilities (Phr 462), Prescription Compounding (Phr 463)	4	4	3
Manufacturing Pharmacy (Phr 441)	3	---	---
Natural Products and Drug Principles (Phr 334)	---	3	---
Pharmacopoeial Testing (Phr 363)	---	---	3
Electives	---	2	2
	16	18	17

PRE-MEDICAL CURRICULUM*

First Year

English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
General Chemistry (Ch 104, 105, 106)	5	5	5
General Zoology (ZP 101, 102, 103)	3	3	3
General Physics (Ph 121, 122, 123)	4	4	4
Gymnastics and Calisthenics (PEm 111, 112, 113)	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

*Completion of this curriculum prepares students for clear entrance into any Class A medical school but does not lead to a degree. Credits for all courses, however, may be applied toward graduation in either of the degree curricula of the School of Pharmacy, or in any school or department of the College granting degrees.

The first two years of the above curriculum together with an additional year of a modern language meets the requirements of all schools of medicine requiring two years of collegiate work. Completion of the entire curriculum is necessary for clear entrance into medical schools requiring three years of college work.

Of modern languages, German and French are preferred. A reading knowledge of one of these languages is desired. If the student has credit for two years of either language in high school one year of college work is required. If the student does not present two years of French or German for college entrance he must complete two years of either language in college.

As desirable electives the following are suggested: Psychology, History, Economics, Literature, College Algebra and Trigonometry, additional English, Sociology, and Civics. As additional electives: Zoology, Political Science, Botany, additional Chemistry, and Business Courses.

Second Year

	Term		
	1st	2d	3d
Organic Chemistry (Ch 226, 227)	5	5	5
Quantitative Analysis (Ch 244)	3	3	3
Mammalian Anatomy (ZP 211, 212, 213)	3	3	3
German or French	3	3	3
Economic History of the United States (ES 201)	3	3	3
Introduction to Economics (ES 391)	3	3	3
General Sociology (ES 305)	3	3	4
Gymnastics and Calisthenics (PEm 211, 212, 213)	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
Military Science and Tactics	2	2	2
	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>	<u>17$\frac{1}{2}$</u>

Third Year

General Bacteriology (Bac 203)	3	---	---
German or French	3	3	3
Genetics (ZP 351)	3	---	---
History of Western Civilization II, III (Hst 212, 213)	---	3	3
Elementary Psychology (Psy 301)	---	---	3
American Literature (Eng 431, 432)	3	3	---
Practical Public Speaking I (PSP 254)	---	3	---
Advanced English Composition (Eng 201)	---	---	3
Electives	5	5	5
	<u>17</u>	<u>17</u>	<u>17</u>

COURSES IN PHARMACY

Phr 111. **Theoretical Pharmacy.** A systematic study of the apparatus and processes of operative pharmacy, including nomenclature of the United States Pharmacopoeia and National Formulary; metrology, including balances, weights, and measures, specific gravity; the generation, uses, and measurement of heat; distillation; sublimation; precipitation processes; extraction in its various forms, and all other processes used in the manufacture of medicinal preparations. Part I of Arny's Principles of Pharmacy together with lecture notes are used as the text-book.

Required in Pharmacy; freshman year; first term; 1 credit; 1 lecture; 1 recitation. *A. Ziefle*

Phr 112. **Theoretical Pharmacy.** A continuation of Phr 111.

Required in Pharmacy; freshman year; second term; 1 credit; 1 lecture; 1 recitation. *A. Ziefle*

Phr 113. **Theoretical Pharmacy.** A continuation of Phr 112.

Required in Pharmacy; freshman year; third term; 2 credits; 2 lectures; 1 recitation. *A. Ziefle*

Phr 221. **Commercial Pharmacy I.** Principles of practical drug store work, such as store arrangement, showcase and window display; printing of labels, price tags, and simple display signs; preparation of display standards and backgrounds; and other practical work. The model drug store and sign-card painting and window-trimming department will be used as laboratories. Printed laboratory notes and assigned readings.

Required in Pharmacy; first term; 2 credits; 3 two-hour laboratory periods. Fee \$3.50. Deposit \$0.50. *J. L. Powers*

Phr 222. Commercial Pharmacy II. A continuation of Phr 221, together with instruction in drug-store management; marking and inventory of drug stocks; preparation of state and Federal drug reports; side lines; knowledge and care of stocks, etc.

Prerequisite: Phr 221. Elective in Pharmacy; any term; 2 credits; 3 two-hour laboratory periods. Fee \$3.50. Deposit \$0.50.

Phr 321. Pharmaceutical Calculations. Study of calculations common to pharmacy; weights and measures; percentage solutions; alligations; specific gravity; thermometers; etc.

Prerequisites: Phr 111, Ch 104. Required in Pharmacy; junior year; third term; 2 credits; 1 lecture; 1 recitation. *J. L. Powers*

Phr 333. Practical Pharmacy. A study of the various types of galenic preparations as outlined in Part II of Arny's Principles of Pharmacy and in the U. S. Pharmacopoeia and National Formulary.

Prerequisites: Phr 113, Ch 105. Required in Pharmacy; junior year; first or second term; 3 credits; 2 lectures; 1 recitation.

J. L. Powers

Phr 334. Natural Products and Drug Principles. A combined lecture and laboratory course on the natural products, active constituents of drugs, synthetic drugs, and newer remedies. The purpose of the course is to study all official and unofficial drugs in these classes in groups, the methods of isolation and manufacture, physical characteristics, incompatibility, medicinal and technical uses, confirmatory tests, and tests for adulteration and deterioration.

Prerequisites: Phr 111, Ch 106. Required in Pharmacy; junior year; first or second term; 3 credits; 1 recitation; 2 three-hour laboratory periods. Fee \$6.50. Deposit \$1.00. *F. A. Gilfillan*

Phr 343. Pharmaceutical Preparations. Laboratory work in the preparation of simple galenicals, such as waters, pills, emulsions, suppositories, ointments, troches. Frequent identification examinations are held to familiarize students with the characteristics of the drugs they use, as well as of the preparations they make.

Prerequisites: Registration in Phr 133, Ch 105. Required in Pharmacy; junior year; second or third term; 3 credits; 3 three-hour laboratory periods. Fee \$8.50. Deposit \$1.50. *J. L. Powers*

Phr 351. Pharmacognosy. Study of animal and vegetable drugs with reference to their habitat, botanical classification, official titles, synonyms, constituents, uses, identification, and standardization.

Prerequisites or parallel: Phr 113; Ch 106, 131. Required in Pharmacy; junior year; first term; 2 credits; 2 lectures; 1 recitation. Fee \$2.50. *F. A. Gilfillan*

Phr 352. **Pharmacognosy.** A continuation of Phr 351. Required in Pharmacy; junior year; second term; 4 credits; 3 lectures; 2 recitations. Fee \$2.50. *F. A. Gilfillan*

Phr 353. **Inorganic Pharmacy.** Inorganic chemicals and their preparations used in medicine. Part III of Arny's Principles of Pharmacy is used as a lecture outline. In the laboratory students make representative samples of certain types of chemicals, as well as tests for impurities, such as arsenic, lead, antimony, etc.

Prerequisites: Phr 333, 343; Ch 105. Required in Pharmacy; junior year; third term; 3 credits; 1 lecture; 1 recitation; 1 three-hour laboratory period. Fee \$5.00. Deposit \$1.00. *A. Ziefle*

Phr 363. **Pharmacopoeial Testing.** The testing of the more common official and unofficial drugs for their purity and strength. Students analyze the preparations made in the laboratory, as well as other substances used in dispensing practice.

Prerequisites: Phr 334, Ch 227. Required in Pharmacy; junior year; second or third term; 3 credits; 3 three-hour laboratory periods. Fee \$6.50. Deposit \$1.00. *F. A. Gilfillan*

Phr 431. **U. S. Pharmacopoeia and National Formulary.** All drugs listed in the United States Pharmacopoeia and National Formulary, as well as all important unofficial drugs and preparations in the dispensaries are studied. Emphasis is placed on composition, uses, methods of manufacture, reasons for each step in the process of manufacture, and all other important data concerning the drug.

Prerequisites: Phr 343, 352; Ch 227. Required in Pharmacy; senior year; first term; 3 credits; 2 lectures; 2 recitations.

A. Ziefle

Phr 432. **U. S. Pharmacopoeia and National Formulary.** A continuation of Phr 431, with frequent reports on all pharmaceutical literature especially with regard to the newer remedies.

Prerequisites: Phr 351, Ch 227. Required in Pharmacy; senior year; second term; 3 credits; 2 lectures; 2 recitations.

A. Ziefle

Phr 433. **U. S. Pharmacopoeia and National Formulary.** A continuation of Phr 432 with the added feature of preparing students for state pharmacy examinations. In addition to a complete review of all pharmacy subjects and the study of typical state

board questions, students are grounded in pharmaceutical legislation, identification of drugs and preparations, as well as in other subjects which will prepare them not only for state pharmacy examinations but for efficient service in practical drug-store work.

Prerequisite: Phr 432. Required in Pharmacy; senior year; third term; 3 credits; 2 lectures; 2 recitations. *A. Ziefle*

Phr 441. **Manufacturing Pharmacy.** This course deals with the manufacture of the more complex pharmaceuticals involving chemical reactions in their preparation. The aim of the course is to familiarize students with the accepted methods of manufacture of drugs in order that they may compound small amounts of chemicals often required in compounding special prescriptions.

Prerequisites: Phr 333, 343; Ch 106, 231. Required in Pharmacy; senior year; first term; 3 credits; 3 three-hour laboratory periods. Fee \$8.50. Deposit \$1.50. *F. A. Gilfillan*

Phr 451. **Materia Medica.** A study of the physiological action and medicinal uses of drugs on the human organism. Drugs are classified according to the arrangement in Cushny's Pharmacology, and the subject is treated in the following order: factors influencing the use of remedies: definitions of medical terms; dose and action; official definitions and constituents. The toxicology of each drug is considered at the time a poisonous drug is studied and special attention is given to action in intended and accidental administration, identification, and antidotes.

Prerequisites: Phr 343, 352; Ch 106, 131. Required in Pharmacy; senior year; first term; 3 credits; 1 lecture; 2 recitations. *F. A. Gilfillan*

Phr 452. **Materia Medica.** A continuation of Phr 451.

Prerequisites: Phr 451, Ch 226. Required in Pharmacy; senior year; second term; 3 credits; 1 lecture; 2 recitations. *F. A. Gilfillan*

Phr 453. **Materia Medica.** A continuation of Phr 452 with preparation for state board examinations in this subject. State and national laws regarding the sale of poisons and narcotics receive special attention.

Prerequisite: Phr 452. Required in Pharmacy; senior year; third term; 3 credits; 1 lecture; 2 recitations. *F. A. Gilfillan*

Phr 461. **Prescription Lectures.** The theory of prescription compounding as outlined in Scoville, Art of Compounding, is made the basis of the course. The aim is to familiarize students with the approved methods of compounding prescriptions containing ordinary remedies, as well as proprietaries and the newer remedies.

Prerequisites: Phr 343, 352, 353; Ch 106, 131. Required in

Pharmacy; senior year; first term; 4 credits; 2 lectures; 2 recitations.

J. L. Powers

Phr 462. Prescription Incompatibilities. Several hundred incompatibilities in prescriptions studied from the point of view of the cause of the incompatibility, and the best method of overcoming it. Practical druggists throughout the state send in incompatible prescriptions for advice as to the best method of compounding, and these together with the regular type prescriptions as outlined in Ruddiman's *Incompatibilities in Prescriptions* and in current pharmaceutical literature are made the basis of the course.

Prerequisites: Phr 461, Ch 226. Required in Pharmacy; senior year; second term; 4 credits; 2 lectures; 2 recitations.

J. L. Powers

Phr 463. Prescription Compounding. In this course the students apply the principles learned in Phr 462 to the actual compounding of prescriptions. More than one hundred prescriptions representing the general types met with in actual practice are compounded. The latter part of the course deals with the management of a prescription department, the compounding of toilet and domestic preparations, as well as many other methods common to a pharmacy. In preparation for the state pharmacy examination students study the physical characteristics of all common drugs, chemicals, preparations, and synthetics, and are examined in identification.

Prerequisites: Phr 462, Ch 227. Required in Pharmacy; senior year; third term; 3 credits; 3 three-hour laboratory periods. Fee \$8.50. Deposit \$1.50.

J. L. Powers

School of Vocational Education

WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
EDWIN DEVORE RESSLER, A.M., Dean of the School of Vocational Education; Professor of Education.
WESLEYIA BRESSLER TUCKER, Secretary to the Dean.
CLYTIE MAY WORKINGER, Appointments Secretary.

Agricultural Education

HEBER HOWARD GIBSON, A.M., Professor of Agricultural Education.
HAROLD WHITE, B.S., Critic Teacher in Agricultural Education.

Commercial Education

JOHN ANDREW BEXELL, A.M., Professor of Commercial Education.
BERTHA ALICE WHILLOCK, B.S., Supervisor of Practice Teaching in Commerce.
JEAN ELIZABETH VANCE, B.S., Critic Teacher in Commercial Education.

Education

EDWIN DEVORE RESSLER, A.M., Professor of Education.
JAMES FREDERICK BURSCH, A.M., Assistant Professor of Education.

Home Economics Education

FLORENCE BLAZIER, Ph.B., A.M., Professor of Home Economics Education.
BESS CHAPPELL, A.M., State Supervisor and Teacher Trainer in Vocational Home Economics.
LURA AMELIA KEISER, B.S., Critic Teacher in Home Economics Education.
MARY STEWART LYLE, M.S., Critic Teacher in Home Economics Education.

Industrial Education

AMBROSE REUBEN NICHOLS, B.S., Associate Professor of Industrial Education.
JACOB THOMAS TURNER, B.S., Instructor in Industrial Education; Critic Teacher.

Physical Education for Women

HARRIET FOREST MOORE, M.S., Critic Teacher in Physical Education for Women.

Psychology

JESSE FRANKLIN BRUMBAUGH, LL.B., A.M., Professor of Psychology.

Systematic teacher-training was begun in the Oregon Agricultural College in 1909 with the establishment of a department of Industrial Pedagogy. This was in response to a demand by the public schools for qualified teachers of agriculture, commercial subjects, home economics, and manual training. The growth of the department, requiring specialists in methods and supervised teaching, made advisable a school organization, which was effected in 1918, with six departments. From the beginning and since the organization of the School, students preparing to teach have been registered in the schools in which their technical subjects are taught. Thus the prospective teacher of (a) agriculture receives his degree in the School of Agriculture, (b) commercial subjects in the School of Commerce, and likewise in other lines.

Curriculum. The School of Vocational Education offers a four-year curriculum leading to the degree of Bachelor of Science. Students preparing to teach Agriculture, Commerce, Home Economics, or Industrial Arts, who enter the College as freshmen, however, are advised to register in the degree curriculum in the school offering the technical work desired. The Oregon School Law grants a high-school teaching certificate to graduates of any degree curriculum offered in the College to students who have taken 23 term credits (15 semester credits) in Education. Students should consult the Dean of the School of Vocational Education in scheduling Education credits.

The degree curriculum is planned especially for students who desire to major in Vocational Education. Thirty-six credits in Education are prescribed and provision is made for additional Education credits under electives. Eighteen credits are required in technical courses offered in the degree curricula of schools in the College other than the School of Vocational Education. In addition to the subjects prescribed by College regulations, general or cultural courses are recommended in recognition of the need of a broad training by the teacher, whose duties call for leadership outside the walls of the classroom. The needs of several classes of students are met by the degree curriculum.

(1) In increasing number, graduates of two-year standard normal-school courses and transfers from colleges and other higher educational institutions are coming to the College with one or more years of college credit on entrance. Some of these students desire a more general course in vocational subjects than the degree curricula prescribed in the technical schools. The degree curriculum in Vocational Education, with its electives, makes possible the acceptance of college credits from other institutions and thus enables such students to enroll in the technical courses for which

they come to the institution and still graduate within the four years generally allotted to an undergraduate course.

(2) Some students desire to prepare for supervisory and administrative vocational positions calling for more general courses than can be secured in any one of the technical schools. The large cities have such supervisors and smaller cities offering a variety of vocational courses are beginning to appoint them. There is a good field for specialization in this line. Such students desire to take technical courses in several schools and a larger number of courses in the pedagogical phases of vocational education.

(3) There are other students who wish to prepare to teach a combination of vocational branches, such as agriculture and manual training, commerce and home economics; or a combination of vocational branches with "related subjects," such as home economics and natural science, manual training and mathematics. There is, and will continue to be for many years, a considerable demand for such teachers in the smaller high schools of Oregon.

(4) A demand has recently arisen for instructors who are prepared to teach in vocational schools, the so-called "related subjects," including mechanical drawing, designing, shop mathematics, industrial chemistry, physics, business English, commercial geography, commercial law, etc. The Federal and State Boards for Vocational Education make provision for the employment of such teachers under the Smith-Hughes Act. The Oregon Board of Vocational Education has assigned to this institution such teacher-training.

(5) Students desiring preparation for teaching Physical Education in combination with vocational and related subjects may include the necessary Physical Education courses in the electives provided in the four-year curriculum of the School of Vocational Education.

Opportunities. For the past several years, more than one hundred graduates annually have prepared to teach vocational subjects. Appointments exceeding two hundred, including previous graduates, are made each year to positions in Oregon, other Pacific Slope states, and also in the Middle West and the East. The principal field of service is in high schools, but the number receiving appointments in normal schools, colleges, and universities is increasing annually.

The School is called on to supply vocational teachers who are able to meet the standards set by the State Board of Vocational Education in accordance with the requirements of the Smith-Hughes Act. Teachers meeting these requirements, and securing

positions under direction of the State Board, receive part of their salaries from Federal and state funds. The School of Vocational Education has been designated by the State Board to train such teachers.

The School of Vocational Education makes provision for giving further professional training to teachers of experience and pedagogical training to men and women who already have technical knowledge and skill in a particular trade and desire training in teaching in that field. The College offers special opportunities to graduates of normal schools and schools of education, with teaching experience, for technical training in some line of vocational education or for special training in teaching and supervising vocational subjects.

Students are advised to consider carefully the selection of teaching as a vocation. Thorough scholarship and fair command of spoken and written English are fundamental essentials for success in the vocation of teaching. Personality, character, and professional aptitude are also demanded. Students with scholarship average below B should confer with the Dean of the School of Vocational Education before registering in any educational course. Only capable candidates will be recommended for teaching positions.

Appointments Office. The College maintains an office for the registration of alumni who wish to secure teaching positions, and the recommendation of teachers is recognized as an important function of the institution. Full information regarding preparation and experience of candidates is kept on file and is furnished those desiring to secure teachers. Forms for registration may be obtained upon request. The Appointments Secretary investigates certification requirements in other states, school laws, etc., so that accurate information may be given upon request. Alumni elected to teach in other states are recommended for certificates by this office. There is no registration fee and no commission is charged those who receive appointment through this office. All communications should be addressed to the Appointments Secretary, Oregon Agricultural College, Corvallis, Oregon.

Equipment. The technical courses of the School of Vocational Education are given in the Schools of Agriculture, Commerce, Engineering, Home Economics, and Basic Arts and Sciences, making available all their equipment to the students and instructors in the School of Vocational Education. The instructors in the professional courses in Education also use this equipment. For the courses in supervised teaching, there is available, in addition, the equipment of the Corvallis public schools through a joint arrange-

ment between the Corvallis Board of Education and the Board of Regents of the College.

Required Education Courses. The sequence of courses in Education is shown in the degree curriculum. For those students planning to complete the 23 credits in Education, who are registered in the technical schools, the following courses are required: Elementary or Vocational Psychology (Psy 301, 302 or 312), Principles of Teaching (Ed 311), Vocational Education (Ed 323), Secondary Education (according to major), Supervised Teaching (according to major). Other courses in Education, to make up the total of 23 credits, are subject to election. Students are advised to consult with the Dean.

CURRICULUM IN VOCATIONAL EDUCATION*

(B.S. Degree)

	Term		
	1st	2d	3d
Freshman Year			
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
¹ General Zoology (ZP 101, 102, 103)	3	3	3
History of Western Civilization II, III (Hst 212, 213)	3	3	.....
Practical Public Speaking I (PSP 254) .....	.....	.....	3
Library Practice (Lib 100) .....	.....	.....	1
Gymnastics (PEW 111, 112, 113) (Women)	1	1	1
Social Ethics (PEW 121), Hygiene (PEW 122) (Women)	1	1	.....
Gymnastics and Calisthenics (PEM 111, 112, 113) (Men)	($\frac{1}{2}$)	($\frac{1}{2}$)	($\frac{1}{2}$)
Military Science and Tactics (Men)	(2)	(2)	(2)
² Technical electives	5	5	5
	16	16	16
Sophomore Year			
Elementary Psychology (Psy 301, 302)	3	3	.....
¹ General Chemistry (Ch 101, 102, 103)	3	3	3
Elementary Industrial Journalism (IJ 200) .....	.....	.....	3
Introduction to Education (Ed 301)	3	.....	.....
Vocational Education (Ed 323) .....	.....	2	.....
History of Education (Ed 341) .....	.....	.....	3
Principles of Dietetics (HS 200) .....	.....	1	.....
Gymnastics (PEW 211, 212, 213) (Women)	1	1	1
Gymnastics and Calisthenics (PEM 211, 212, 213) (Men)	($\frac{1}{2}$)	($\frac{1}{2}$)	($\frac{1}{2}$)
Military Science and Tactics (Men)	(2)	(2)	(2)
² Technical electives	6	6	6
	16	16	16

*As in other curricula of the College, men must complete 207 credits, including Physical Education and Military Science and Tactics.

¹Eighteen credits in Biologic or Physical Science are required. Substitution of other sciences for those listed in this curriculum will be made by the Dean in cases where the student's program makes it desirable.

²Subject to approval of the Dean.

Junior Year

	Term		
	1st	2d	3d
¹ Finance and Administration	3	---	---
¹ Economics	---	3	---
¹ Political Science	---	---	3
Principles of Teaching (Ed 311).....	3	---	---
Educational Psychology (Psy 322)	3	---	---
² Methods of Teaching	---	3	3
³ English	---	3	3
Advanced Gymnastics (PEW 311, 312, 313) (Women)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
¹ Technical and other electives	$6\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$
	16	16	16

Senior Year

Measurement in Education (Ed 333)	---	3	---
² Supervised Teaching and elective Education courses.....	3	3	3
³ English	---	---	3
¹ Sociology	3	---	---
¹ Technical and other electives	10	10	10
	16	16	16

AGRICULTURAL EDUCATION

This department is responsible for the training of teachers and supervisors of Agriculture in elementary and secondary schools, and the development of leadership in rural life and education. Special attention is given to the training of directors, supervisors, and teachers of Agriculture as provided for by the Federal law for vocational education known as the Smith-Hughes Act. Certain field studies and extension activities are included within the scope of this department's work.

Requirements in Agriculture. Teachers of vocational agriculture are required to have a degree in Agriculture with a minor in Agricultural Education. Credits in Agriculture and related sciences should include the basic sciences, and courses in Agricultural Engineering, Animal Husbandry and Dairying, Poultry Husbandry, Soils and Crops, Horticulture, and Farm Management. The prescribed curriculum for prospective teachers of agriculture is given in the School of Agriculture.

Requirements in Education. Not less than twenty-three term credits shall be in Education of which nineteen are prescribed as follows: Elementary or Vocational Psychology (Psy 301, 302, or 312), 6 credits; Principles of Teaching (Ed 311), 3 credits; Vocational Education (Ed 323), 2 credits; Secondary Education in Agricul-

¹Subject to approval of the Dean.

²Selected according to the major, subject to approval of the Dean.

³Courses in Composition or in Business English will not satisfy this requirement.

ture (AEd 411), 5 credits; Supervised Teaching in Secondary Agriculture (AEd 412 or AEd 413), 3 credits. Not later than the beginning of the junior year and during the junior and senior years the prospective teacher of Agriculture should confer with the department of Agricultural Education in planning his entire curriculum.

Graduate Curriculum in Agricultural Education. Several states now require teachers of vocational agriculture to have some graduate training, California requiring a full year. In Oregon, and many other states, students who have completed the work prescribed in this catalogue for teachers of vocational agriculture can meet the requirements for state certification. Since the demands upon such teachers the country over, however, are becoming more exacting each year, graduate work in the fields of agriculture and education is desirable, and usually necessary for those who desire to enter the fields of supervision or teacher training. A program of work leading to the degree of Master of Science will be outlined by this department for students and teachers with approved standing.

COURSES

AEd 411. Secondary Education in Agriculture. An analysis of problems and methods in teaching agriculture in secondary schools. Curriculum building and the teaching process; place and relationships of the teacher of Agriculture in the public school system and in a system of state and Federal supervision; community and extension activities; up-to-date methods in teaching Agriculture with special attention to the use of local farm and community resources; the place and use of the farm project and other forms of supervised farm practice.

Prerequisites: Psy 302, Ed 311. Required in Agricultural Education; junior or senior year; first or second term; 5 credits; 5 recitations.
H. H. Gibson

AEd 412. Supervised Teaching in Secondary Agriculture. Observation and teaching of vocational agriculture conducted according to the Oregon state plan for vocational education under supervision of this department. The departments of agriculture of the local high schools are used for this teaching. Supervision of projects and assistance in community activities are an important phase of this course.

Prerequisite: AEd 411. Required in Agricultural Education; senior year; any term; 3 credits (or more by arrangement); 3 two-hour periods including teaching and observation.

H. H. Gibson, H. H. White

AEd 413. Supervised Teaching in Secondary Agriculture. Apprentice teaching in agricultural departments of Smith-Hughes high schools throughout the state under the supervision of the department.

Prerequisite: AEd 411. Elective in Agricultural Education; senior year; any term; credits to be arranged. *H. H. Gibson*

AEd 431. Rural Education. The social and community elements of rural and agricultural education in relation to the school program; the place of the school in relation to other educational agencies; organization of a community program with reference to economic, social, and educational activities, and adapted to the needs of both elementary schools and high schools. This course is required of prospective teachers of Agriculture; recommended as an elective to others interested in improvement of the rural communities.

Elective; junior or senior year; third term; 3 credits; 3 recitations. *H. H. Gibson*

AEd 432. Club Work and Agriculture in the Elementary School. Aims, materials, and methods of teaching and supervising elementary agriculture in upper elementary grades and junior high school. Stress is given to club work, covering its history, scope, organization, supervision, and administration. For prospective agricultural teachers, county agents, and club leaders.

Elective; junior or senior year; second term; 3 credits; 3 recitations.

AEd 482, 483. Seminar in Agricultural Education. A discussion of special problems in the teaching of agriculture and in the administration of agricultural education.

Required of graduate students and elective for seniors in Agricultural Education; second and third terms; time and credits to be arranged. *H. H. Gibson*

AEd 533. Rural School Surveys. Principles and practice of making agricultural and rural education surveys as a basis for organizing programs for Agricultural Education. The technique of making such surveys and methods of analyzing, interpreting, and using the material and results of surveys already made will be emphasized. Individual practice in making a survey is required as a part of the course. Open to graduates with teaching experience and seniors by special permission.

Elective in Agricultural Education; third term; 2 credits.

H. H. Gibson

AEd 534. Extension Course in Teacher Training. This course is designed primarily for teachers of vocational agriculture in ser-

vice who cannot be relieved of their professional duties to pursue courses that are offered in the Summer Session, but who wish to continue their professional improvement. Personal conferences, follow-up instruction, and supervision, supplemented by correspondence and reports.

Elective; any term; credits to be arranged. *H. H. Gibson*

AEd 611. Agriculture in Secondary Schools. (Similar to AEd 411, but for graduate students.) A study of the organization, administration, and methods of teaching agriculture. This course is based largely on the use of materials secured from records and reports and by means of excursions and field studies which are required for the work. Not open to students who have undergraduate credit in AEd 411.

Prerequisites: Psy 302, Ed 311. Elective; senior or graduate year; first or second term; 5 credits; 5 recitations.

AEd 613. Teaching Agriculture. (Similar to AEd 413, but for graduate students.) A limited number of graduate students and seniors with advanced standing will be given an opportunity to teach agriculture in selected high schools of the state under guidance of the department. A study and report of administrative, supervisory, and instructional features of the school in which the student teacher is located will be a required part of this course. Not open to students who have undergraduate credit in AEd 413.

Prerequisites: Psy 302, Ed 311, AEd 411 or equivalent. Elective; senior or graduate year; any term; credits to be arranged but not to exceed ten.

COMMERCIAL EDUCATION

The department of Commercial Education has been organized to meet the steadily growing demand for well-equipped teachers of commercial branches in secondary schools. Such teachers are prepared in cooperation with the School of Commerce. The curriculum in the School of Commerce leading to the degree of Bachelor of Science makes possible satisfactory preparation for commercial teaching. In the selection of their collegiate courses in both Commerce and Education, students should advise with the head of the department of Commercial Education. This department provides an equipment for teachers of commercial science in secondary schools that will place them and their work on a parity with those of other longer established and more fully developed departments of the high school.

The 23 credits in Education required for a certificate to teach in four-year high schools, issued without examination, may be

earned during the college course, preferably in the junior and senior years. Elementary Psychology and Principles of Teaching should be taken before any methods course. The required Education courses must include Psy 302, Ed 311, Ed 323, one course in Secondary Education in Commerce, and one course in Supervised Teaching in Commerce, the last in the senior year. Supervised teaching is done in a public high school where conditions are normal and the experience real. For the major curriculum in Commercial Education, see pages 197-198.

COURSES

Ced 451. Secondary Education in Commerce. Principles of education as applied to the teaching of shorthand, typewriting, business English, and bookkeeping in high schools; rapid review of subject-matter with model lessons in each subject; lectures covering aims, materials, methods of presentation, organization of courses, and arrangement of curriculum.

Prerequisites: ST 203, FA 103, Psy 302 or 312, Ed 311. Required of students preparing to teach stenographic subjects; junior year (second term) or senior year (first term); 3 credits; 3 lectures.
J. A. Bexell, Bertha Whillock

Ced 452. Secondary Education in Commerce. Same as CED 451, with special methods in teaching Accounting, Business Law, Economics, and Commercial Geography.

Prerequisites: FA 203, PS 202, ES 203, Psy 302 or 312, Ed 311. Required of students preparing to teach accounting subjects; senior year; first or second term; 3 credits; 3 lectures.

J. A. Bexell, L. C. Ball

Ced 461. Supervised Teaching in Commerce. Facilities are afforded students in Commercial Education to secure experience in teaching classes in stenographic subjects both at the College and at the Corvallis High School.

Prerequisite: CED 451. Elective to seniors only; any term; 5 credits; 1 lecture; 5 double periods. *Bertha Whillock, Jean Vance*

Ced 462. Supervised Teaching in Commerce. Same as CED 461, with supervised teaching in subjects of accounting group.

Prerequisite: CED 452. Elective to seniors only; any term; 5 credits; 1 lecture; 5 double periods. *Bertha Whillock*

Ced 470. Organization and Administration of Commercial Education. This course is planned for individuals who aspire to attain administrative positions in the field of commercial education.

Prerequisites: CE 451, 452. Elective to seniors only; third term; 3 credits; 3 lectures. *J. A. Bexell*

EDUCATION

This department gives general courses in Education upon which courses in special methods are based. The courses are open to all students prepared to take them.

COURSES

Ed 301. Introduction to Education. Brief discussion of the meaning, function, and scope of education; organization and function of each division of the American system; school and class management; general method; all with particular reference to the vocational teacher.

Required in Vocational Education; sophomore year; any term; 3 credits; 3 recitations. *J. F. Bursch*

Ed 311. Principles of Teaching. Application of the laws of psychology to teaching; the significance of individual differences; the types of learning; aims and functions of secondary education; socialization; supervised study; measuring results; special application of foregoing to the teaching of vocational and related subjects.

Prerequisite: Psy 302. Required in Vocational Education; junior year; any term; 3 credits; 3 recitations. *J. F. Bursch*

Ed 323. Vocational Education. Arranged to meet the needs of those preparing to teach any phase of vocational education. History and function of vocational education; development in the United States; requirements of Federal-aided schools and departments under the Smith-Hughes Act.

Required in Agricultural Education (junior year, third term), in Industrial Arts (senior year, second term), and in Vocational Education (sophomore year, second term); elective for students in other schools (junior or senior year, any term); 2 credits; 2 recitations. *H. H. Gibson*

Ed 333. Measurement in Education. A survey of standardized education, mental, trade, and special ability tests of proved value in the public schools; history and theory of standard test construction; special attention to mental tests and tests of industrial and vocational fitness.

Prerequisites: Psy 302, Ed 301 or equivalent. Required in Vocational Education; senior year; second or third term; 3 credits; 3 recitations. *J. F. Bursch*

Ed 341. History of Education. A general review of the growth and development of education and its relation to the

civilization of the times; particular attention given to the rise of industrial education in Europe and America, and its place in the social and political life of the country.

Required in Vocational Education; sophomore year; first or third term; 3 credits; 3 recitations. *J. F. Brumbaugh*

Ed 422. **Civic Education.** A study of the school as an instrument of society for transmitting its social inheritance; analysis of school organization, administration, school subjects, methods of instruction, extra-school activities, and methods of discipline with reference to their contribution to training for citizenship.

Prerequisites: Psy 302, Ed 301 or equivalent. Elective; senior year; first term; 3 credits; 3 recitations. *J. F. Bursch*

Ed 431. **Vocational Guidance.** An investigation of the means and methods of assisting pupils of upper grammar grades and high school in studying the problems of their future vocations; studies of occupations with essential qualifications for success in leading types; value of "life career" motive in education; survey of state and local resources as guides to choice, etc.

Prerequisites: Ed 311, 333. Elective; junior or senior year; second term; 2 credits; 2 recitations. *A. R. Nichols*

Ed 452. **School Administration.** A discussion and analysis of the American system of education, with an interpretation of the purpose and spirit of each division; problems of administration and teaching; correlation of the vocational branches with other subjects in the curriculum.

Prerequisites: Ed 311, 333. Elective; advanced or graduate students; second term; 2 credits; 2 recitations. *E. D. Ressler*

Ed 461. **School Hygiene.** A course in the health provisions requisite for the hygienic conduct of education. Oregon laws, regulations of the State Board of Health, and other state and local authorities explained in detail.

Prerequisites: Ed 333; also one or more courses each in biological and physical science. Elective to advanced or graduate students; third term; 2 credits; 2 recitations.

Ed 491, 492, 493. **Investigation.** Advanced or graduate students qualified by previous training or experience may register for extended investigation of some specific problem in vocational education. These studies are assigned and outlined by the instructor and stated reports are made from time to time by the student.

Elective to advanced or graduate students; three terms; credits to be arranged.

Ed 633. **Advanced Educational Tests and Measurements.** (Similar to Ed 333, but for graduate students.) To familiarize the stu-

dent with the experimental procedure necessary to standardize test items and to organize them into batteries. Supervised practice in the use of both mental and achievement tests is provided. A survey is made of the present practice in the use of tests in education and vocational guidance. Not open to students who have undergraduate credit in Ed 333.

Prerequisites: Psy 302, Ed 301 or equivalent. Elective; graduate year; second or third term; 3 credits; 3 recitations.

HOME ECONOMICS EDUCATION

The function of this department is to give professional training to prospective teachers of Home Economics. All students having a scholarship average below 85 should confer with the head of the department before registering for teacher training work.

COURSES

HEd 304. Secondary Education in Home Economics. A brief history of Home Economics instruction and of the development of elementary and secondary Home Economics; equipment and organization of Home Economics departments; study of Smith-Hughes problems in Home Economics.

Prerequisites: Psy 302, Ed 311. Elective; junior year (second term) or senior year (first term); 3 credits; 3 recitations.

Florence E. Blazier

HEd 305. Secondary Education in Home Economics. Making of lesson plans; study of special problems; the preparation and collection of illustrative material; making of courses of study; observation of teaching.

Prerequisite: HEd 304. Junior year (third term) or senior year (first term); 3 credits; 3 recitations.

Florence E. Blazier

HEd 421. Supervised Teaching in Home Economics. Observation and teaching under supervision in the Corvallis junior and senior high schools.

Prerequisite: HEd 305. Senior year; any term; 4 credits; 2 recitations; 5 double periods supervised teaching.

Florence E. Blazier, Lura A. Keiser, Mary S. Lyle

HEd 422. Supervised Teaching in Home Economics. Continuation of HEd 421. An advanced course.

Prerequisite: HEd 421 or teaching experience. Elective; senior year; any term; 1 to 3 credits.

Florence E. Blazier, Lura A. Keiser, Mary S. Lyle

INDUSTRIAL EDUCATION

A strong demand for college-trained teachers of trades and industries has been created by the Smith-Hughes Act, which provides Federal aid for secondary schools giving approved courses in these subjects. The College has made special provision for training students for the teaching of vocations in secondary schools, night schools, and trade extension schools, which fulfill the requirements for Federal aid under the Smith-Hughes Act. Students desiring to prepare to teach Manual Training or Industrial Arts will find professional courses especially adapted to their needs. Courses are offered in Portland as well as in Corvallis.

COURSES

IEd 301. Special Methods in Trades and Industries. The analysis of type jobs in the building trades, automobile mechanics, plumbing, blacksmithing, and all allied trades; investigations into the values of the different elements of these trades or industries for the purpose of selecting a well-balanced course of study; lectures, readings, discussions, and analysis cards. The organization of this material to conform to the requirements of the Smith-Hughes Act.

Prerequisites: Psy 302 or 312, Ed 311. Required for prospective Smith-Hughes teachers; junior year (third term) or senior year (first term); 3 credits; 3 recitations. *A. R. Nichols*

IEd 302. Special Methods in Trades and Industries. Organization of material brought out in analysis of course IEd 301 into definite lessons, taking into consideration the subject of learning difficulties, making out lesson plans for at least twenty-four type lessons.

Prerequisite: IEd 301. Required of students preparing to teach a trade or industry in trade extension, day, part-time or night classes; senior year; first or second term; 3 credits; 3 recitations. *A. R. Nichols*

IEd 341. Special Methods in Manual Training. A careful, detailed analysis of type jobs which are included in industrial arts teaching, found in cabinet making, patternmaking, blacksmithing, machine shop practice, plumbing, automobile mechanics, carpentry, etc.; the organization of the material into a course of study for use in the public schools; outlines of model courses of study for both elementary and secondary grades; plans for desirable equipment for shop and classroom work.

Prerequisites: Psy 302 or 312; Ed 311. Required in Industrial Arts; junior year (third term) or senior year (first term); 3 credits.

A. R. Nichols

IED 342. Special Methods in Manual Training. A study of the methods of organization and planning of lessons for public school teaching. The working out of at least twenty-four type lessons based on the material worked out in IEd 341, to serve as a guide in teaching in the public schools.

Prerequisite: IEd 341. Required in Industrial Arts; senior year; first or second term; 3 credits; 3 recitations. *A. R. Nichols*

IED 382. Theory and Practice of Elementary Manual Arts. For supervisors of industrial arts in the lower grades. Investigation of the present trend of the manual arts movement; arrangement of a suggestive course of study; plan of equipment; ordering of supplies, etc.; lectures; assigned readings, reports, and practical shop work.

Prerequisite: Ed 311. Elective; junior or senior year; second term; 3 credits; 2 recitations; 1 two-hour laboratory period.

A. R. Nichols

IED 421. Supervised Teaching in Trades and Industries. The student is required to arrange and submit definite plans and outlines of the subject, job, or lesson to be taught. Reports to the director, supervisor, or critic teacher are made for the purpose of perfecting the student teacher in the technique of the trade to be taught.

Prerequisite: IEd 302. Required of students preparing to teach a trade or industry; senior year; first or second term; 5 credits; 1 recitation; 5 double periods. *A. R. Nichols, J. T. Turner*

IED 461. Supervised Teaching in Manual Training. The student submits definite plans for lessons in actual teaching. He takes complete charge of a class in either drawing or shop work through the term. Reports to the instructor are required.

Prerequisite: IEd 342. Required in Industrial Arts; senior year; first or second term; 5 credits; 1 recitation; 5 double periods.

A. R. Nichols, J. T. Turner

IED 462. Supervised Teaching in Industrial Arts.

Prerequisite: IEd 421 or 461. Elective; senior year; third term; 5 credits; 5 double periods; 1 recitation.

A. R. Nichols, J. T. Turner

IED 482. Seminar in Industrial Education. A discussion of a series of questions and problems confronting the industrial arts teacher as well as the trade teacher.

Prerequisite: IEd 302 or 342. Required of graduate students; elective to seniors in Vocational Education and in Industrial Arts; second term; time and credits to be arranged. *A. R. Nichols*

IEd 491. Foreman Training. The course deals with such subjects as supervision of production, management, handling of men, plant practice, etc., which function in the work of every foreman as an industrial producer. The direct aim is to train foremen, minor executives, and others to equip them better to conduct such courses in their own or other plants. Conference method will be followed throughout.

Elective; senior year; third term; 2 credits; 2 two-hour conferences. *A. R. Nichols*

IEd 601. Methods of Teaching Industrial Arts. (Similar to IEd 301, but for graduate students.) Individual problems are assigned and other supplementary work is required. The course is organized on a graduate basis. Not open to students who have undergraduate credit in IEd 301.

Prerequisites: Psy 302, Ed 311. Elective; graduate year; first or third term; 3 credits; 3 recitations.

IEd 602. Methods of Teaching Industrial Arts. (Similar to IEd 302, but for graduate students.) Individual problems are assigned and other supplementary work is required. The course is organized on a graduate basis. Not open to students who have undergraduate credit in IEd 302.

Prerequisite: IEd 601 or equivalent. Elective; graduate year; first or second term; 3 credits; 3 recitations.

IEd 621. Supervised Teaching in Industrial Arts. (Similar to IEd 421, but for graduate students.) More is demanded in this course and all assignments, reports, and rating are on a graduate basis. Not open to students who have undergraduate credit in IEd 421.

Prerequisite: IEd 602 or equivalent. Elective; graduate year; first or second term; 5 credits; 1 recitation; 5 double periods.

PSYCHOLOGY

This department gives the courses in Psychology upon which the studies in education are built and such other courses as directly affect human behavior. All courses are elective to students prepared to take them.

COURSES

Psy 301. Elementary Psychology. A preparatory course in the fundamentals of mental life from the functional standpoint;

emphasis upon the application of psychological laws to the ordinary affairs of life. Covers material concerning the structure and organization of the nervous system and special senses, instincts, habits, sensations, and feeling.

Required in Vocational Education and Pharmacy; prerequisite to all other courses in Psychology, Principles of Education, and Ethics; sophomore year; any term; 3 credits; 3 lectures.

J. F. Brumbaugh

Psy 302. Elementary Psychology. A continuation of Psy 301. Covers material relating to the subjects of perception, conception, memory, reasoning, attention, interest, desire, and will.

Prerequisite: Psy 301. Sophomore year; any term; 3 credits; 3 lectures.

Psy 312. Vocational Psychology. Application of psychological laws to the active pursuits of life; especially the psychology of commerce as it develops in the relation of man to man, of trust and faith in human affairs, modes of activity, etc.

Prerequisite: Psy 301. Required in Advertising and Selling (senior year, third term) and for prospective Smith-Hughes teachers (junior or senior year, first or second term); 3 credits; 3 lectures.

J. F. Brumbaugh

Psy 313. Psychology of Advertising and Selling. Designed to analyze the problem of advertising and to explain the operation of the laws of the mind as related to its solution; to trace and explain the psychological processes involved in the business of merchandising and selling goods of all descriptions.

Prerequisites: FA 141, 142; Psy 301. Required in Commerce; elective to others; senior year; second or third term; 3 credits; 3 lectures.

J. F. Brumbaugh

Psy 322. Educational Psychology. Principles and laws of mental life and development as applied to the teaching process; psychological value of the various methods and paraphernalia of school life.

Prerequisites: Psy 301, 302. Required in Vocational Education and Industrial Arts; junior year; any term; 3 credits; 3 lectures.

J. F. Brumbaugh

Psy 433. The Child Mind. Consideration of the physical and mental development of the child in the various stages; aspects and interrelations, hygienic and moral sides receiving special attention.

Prerequisites: Psy 301, 302. Elective; junior or senior year; first or third term; 2 credits; 2 lectures.

J. F. Brumbaugh

Psy 473. **Principles of Education.** This course expounds the general problems of education and the merits and demerits of the various theories of education as they have succeeded each other, together with the numerous principles which have sprung from such doctrines and the modern reinterpretations of aims and practices connected therewith.

Prerequisites: Psy 301, 302; Ed 301, 311. Elective; junior or senior year; second or third term; 2 credits; 2 lectures.

J. F. Brumbaugh

Eth 482. **Ethics.** Meaning of our moral conceptions and principles; why they are binding; whence they are derived; a consideration of every-day customs and practices in the light of these principles; study of professional codes.

Prerequisites: Psy 301, 302; Ed 301, 311. Elective; junior or senior year; first or second term; 3 credits; 3 lectures.

J. F. Brumbaugh

Chemical Engineering

FLOYD ELBA ROWLAND, Ph.D., Professor of Industrial Chemistry.

JOSEPH PAUL HARVEY, M.S., Assistant Professor of Chemical Engineering.

Chemical Engineering has become a necessary science in the economic management of many of the industries of life. The present need in this country to create new industries to supply products of manufacture formerly imported from abroad has emphasized the demands upon chemistry and chemical engineering.

The curriculum in Chemical Engineering is arranged so that attention is given to the fundamental principles of science. Thorough courses are given in General, Analytical, Organic, and Physical Chemistry, Modern Languages, Physics, and Mathematics. During the course specialized work in Applied Chemistry is offered.

The courses in Industrial or Applied Chemistry given in connection with Chemical Engineering are arranged as follows: (1) Engineering Chemistry (one course); (2) Industrial Inorganic Chemistry (two courses); (3) Industrial Organic Chemistry (two courses); (4) Electrochemical Industries (one course). After performing a limited number of standard experiments in Industrial Chemistry, the student is permitted to select special problems, pertaining, for the most part, to the Northwest, thus enabling him to follow a given line more fully. Problems are studied as to (1) Raw Materials; their valuation and treatment. (2) Process; chemical control and types of apparatus employed in chemical work. (3) Products of Manufacture; their purity and uses. Methods of analysis and the processes involved in large-scale manufacture are studied as described in current literature. In the senior year students are permitted to elect research which permits them to investigate problems and aids in developing their ability for original investigations.

Local chemical industries are visited for the purpose of observing operation on a practical scale. Companies engaged in this work have been most generous in their cooperation.

There is a great need in the West for chemical engineers to help develop the vast resources. For this reason graduates are strongly advised to take advanced work and to extend their knowledge along chosen lines of research so that they may be better fitted to attack problems on their own responsibility.

Equipment. The two laboratories devoted to industrial chemistry are the best equipped in the state. Each desk has a lead top which drains toward the sink in the center. Air, gas, hot and cold water, vacuum, steam, and electricity are supplied at each table. The equipment proper consists of a 12-tray Grinnel steam dryer, a Buflovok vacuum dryer with pump and condenser attached, an arc nitrogen-fixation apparatus which uses 25,000 volts, an autoclave with which reactions requiring pressure of 1,000 pounds to the square inch are studied, a United States air compressor, a Cummings mercury vacuum pump, Duriron sulfonating kettles, colorimeters, flash point and viscosity apparatus for examination of oils and greases. The students are required to familiarize themselves with chemical engineering equipment in order that they will have a better understanding of its operation in commercial work.

CURRICULUM IN CHEMICAL ENGINEERING

(*B.S. Degree*)

Freshman Year

	Term		
	1st	2d	3d
Chemical Engineering Survey (ChE 101, 102, 103)	5	5	5
General Chemistry (Ch 104, 105, 106)	5 $\frac{1}{2}$	5	5
Plane Trigonometry (Mth 111)	4	---	---
Elementary Analysis (Mth 131, 132)	---	4	4
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Elementary German (ML 131, 132, 133)	3	3	3
Gymnastics and Calisthenics (PEm 111, 112, 113)	2 $\frac{1}{2}$	2	2 $\frac{1}{2}$
Military Science and Tactics	2	2	2
	18	18	18

Sophomore Year

Qualitative Analysis (Ch 232)	5	---	---
Quantitative Analysis (Ch 244, 245)	---	5	5
Differential (Mth 251), Integral Calculus (Mth 252, 253)	4	4	4
Intermediate German (ML 231, 232, 233)	3	3	3
Physics (Ph 221, 222, 223)	3	3	3
Gymnastics and Calisthenics (PEm 211, 212, 213)	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Military Science and Tactics	2	2	2
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$

Junior Year

Engineering Chemistry (ChE 311)	3	---	---
Industrial Inorganic Chemistry (ChE 321, 322)	---	3	3
Organic Chemistry (Ch 322, 323)	5	5	---
Organic Analysis (Ch 328)	---	---	5
Physical Chemistry (Ch 381, 382, 383)	3	3	3
Engineering Physics (Ph 311, 312)	3	3	---
National Government (PS 301)	---	---	3
¹ Electives	3	3	3
	17	17	17

¹See footnote on page 344.

	Senior Year		
	1st	2d	3d
Industrial Organic Chemistry (ChE 431, 432)	3	3	.....
Electrochemical Industries (ChE 441) .....	.....	.....	3
Elementary French (ML 111, 112, 113)	3	3	3
Materials of Engineering (MM 311)	3	.....	.....
Metallography and Pyrometry (MM 481) .....	.....	3	.....
Steam and Gas Machinery (Theory) (ME 232), Steam and Gas Machinery (Laboratory Practice) (ME 233) .....	.....	3	2
Seminar (ChE 461, 462, 463)	1	1	1
Introduction to Economics (ES 391)	3	.....	.....
Business Organization and Management (FA 381) .....	.....	.....	3
¹ Electives	3½	3½	4½
	16½	16½	16½

COURSES IN CHEMICAL ENGINEERING

ChE 101, 102, 103. **Chemical Engineering Survey.** A course of lectures for freshmen in Chemical Engineering, which includes a study of great chemists, and the important chemical industries.

Required in Chemical Engineering; freshman year; three terms; 1 lecture; ½ credit each term. *F. E. Rowland*

ChE 311. **Engineering Chemistry.** A course of lectures and laboratory work on the subjects of fuel, combustion, refractories, lubricants, boiler feed waters, iron, steel, alloys, cements.

Required in Chemical Engineering; junior year; first term; 3 credits; 2 lectures; 2 three-hour laboratory periods. Fee \$5.00. Deposit \$2.50. *F. E. Rowland*

ChE 321, 322. **Industrial Inorganic Chemistry.** The principal inorganic industries are studied in lectures while the laboratory work is arranged to develop ability on the part of the student to carry on independent work with confidence.

Required in Chemical Engineering; junior year; second and third terms; 3 credits each term; 2 lecture periods; 2 three-hour laboratory periods. Fee \$5.00 each term. Deposit \$2.50 each term. *F. E. Rowland*

ChE 431, 432. **Industrial Organic Chemistry.** Lectures and laboratory work covering the chief organic branches of industrial chemistry.

¹Suggested electives: Advanced Organic Chemistry (Ch 621, 622, 623); Advanced Inorganic Chemistry (Ch 491); Research (ChE 451, 452, 453); Advanced Physical Chemistry (Ch 484, 485, 486); Physical Chemistry Seminar (Ch 487, 488, 489); Elementary Glass Blowing and Repairing (Ch 411); Advanced German (ML 331, 332, 333); Mechanical Drawing (ME 111, 112, 114); Direct Currents (EE 251); Alternating Currents (EE 252); Electrical Applications (EE 253); Crystallography, Blowpipe Analysis, and Determinative Mineralogy (G 211); Mineralogy (G 212); General Bacteriology (Bac 204, 205).

Required in Chemical Engineering; senior year; first and second terms; 3 credits each term; 2 lectures; 2 three-hour laboratory periods. Fee \$5.00 each term. Deposit \$2.50 each term.

J. P. Harvey

ChE 441. **Electrochemical Industries.** Application of the electric current to the manufacture of chemical materials.

Required in Chemical Engineering; senior year; third term; 3 credits; 2 lectures; 2 three-hour laboratory periods. Fee \$5.00. Deposit \$2.50.

J. P. Harvey

ChE 451, 452, 453. **Research.** Consultation, library, and laboratory work. A course in which the student is permitted to investigate problems independently of others. The preparation of a thesis will be required as evidence of the student's ability.

Elective; senior year; credits to be arranged. Fee \$1.50 each credit. Deposit \$2.50.

F. E. Rowland, J. P. Harvey

ChE 461, 462, 463. **Seminar.** Reports on current topics and reviews of the literature.

Required in Chemical Engineering; senior year; three terms; 1 credit each term; 1 period.

Industrial Journalism

FRANCIS LAWRENCE SNOW, Professor of Industrial Journalism.

CHARLES JARVIS MCINTOSH, B.S.D., B.S., Associate Professor of Industrial Journalism.

ANITA KENNEDY DAVIS, Instructor in Industrial Journalism.

JOHN COLE BURTNER, B.S., Assistant in Industrial Journalism.

Courses in Industrial Journalism are offered to train students to write and edit material on various subjects embraced within the distinctive field of the College, such as Agriculture, Engineering, Forestry, Mining, Home Economics, and the like; to enable them to take positions on farm and trade papers, and other publications, especially where writing on industrial subjects is required; to conduct campus publications and other publications of a technical nature; and to furnish scientific material in popular form to the papers.

These courses are intended to meet the needs of a large group of persons—farmers, county agricultural agents, home demonstration agents, field specialists in the agricultural extension service, research specialists at the agricultural experiment stations, teachers of industrial subjects, and others who may have occasion to prepare material for the press on industrial subjects.

The courses taught are thoroughly practical and form a valuable asset for those who aim to become leaders of community enterprises through the press and in any other capacity for which their technical training fits them. Industrial Journalism does not displace fundamental work in English but supplements it by giving the technique of journalistic writing.

COURSES

IJ 200. Elementary Industrial Journalism. Intended primarily to give students the fundamental principles of news writing. Prepares them for writing technical articles on subjects pertaining to Agriculture, Home Economics, Engineering, etc. Required as a condition of eligibility for leading positions on the staffs of student publications.

Elective; sophomore, junior, or senior year; any term; 3 credits. Fee \$1.00. *F. L. Snow*

IJ 204. Journalism Practice I. IJ 204, 314, and 334 constitute laboratory practice for courses IJ 200, 310, 330 respectively. Opportunity is given to put the fundamental principles of journalism

into practice. In IJ 204 and 314, "beats" are assigned and students receive practical experience in reporting. Special assignments are also given. Students are expected to write for publication. These courses offer students the advantages of training and experience in connection with instruction in corresponding courses.

Elective; sophomore, junior, or senior year; any term; 2 credits. Fee \$1.00. *F. L. Snow*

IJ 310. Industrial Journalism. Continuation of work in course IJ 200. Principles of journalism are applied to the treatment of industrial subjects. Types of news stories are studied, feature stories being given special consideration.

Prerequisite: IJ 200. Elective; junior or senior year; second term; 3 credits; 3 lecture periods. Fee \$1.00. *F. L. Snow*

IJ 314. Journalism Practice II. See IJ 204. Accompanies IJ 310.

Elective; junior or senior year; second term; 2 credits. Fee \$1.00. *F. L. Snow*

IJ 320. Editing. Copy reading, head writing, proof reading, and make-up. Actual experience is given in editing copy for publication. Training is offered that fits students for the work of putting out campus publications.

Prerequisites: IJ 200, 310. Elective; junior or senior year; first term; 3 credits; 3 lecture periods. Fee \$1.00. *C. J. McIntosh*

IJ 323. Writing Advertisements. This course deals with the proper composition of copy for different kinds of periodicals, placards, and circular advertisements. Attention is given to such matters as effective use of different styles and sizes of type, color schemes, and slogans.

Required in Advertising and Selling; senior year; third term; 3 credits; 3 lecture periods. Fee \$1.00. *C. J. McIntosh*

IJ 324. Editing Practice. Supervised work in copy reading, headlining, proof reading, and make-up, not less than six hours. Open only to students who have had training and previous experience in editing.

Prerequisite: IJ 320. Elective; junior or senior year; second or third term; 2 credits; 2 two-hour laboratory periods.

C. J. McIntosh

IJ 330. Technical Journalism. Students are required to prepare copy on subjects pertaining to Agriculture, Engineering, Commerce, Home Economics, etc., and to submit it for publication in farm journals, trade journals, and other periodicals. A study is

made of the demands of these publications for material of a more or less technical nature. Attention is given to illustration. Preparation of publicity matter is considered.

Prerequisites: IJ 200, 310. Elective; junior or senior year; third term; 3 credits; 3 lecture periods. Fee \$1.00. *F. L. Snow*

IJ 334. **Journalism Practice III.** See IJ 204. Accompanies IJ 330.

Elective; junior or senior year; third term; 2 credits. Fee \$1.00. *F. L. Snow*

IJ 440. **Editorial Writing.** Materials, style, and arrangement of periodical editorials are considered. Training is given in writing editorials. Principles of policy and ethics are studied and applied. The make-up of the editorial page of farm and trade journals is given attention.

Prerequisite: IJ 320. Elective; senior year; second term; 3 credits; 3 lecture periods. Fee \$1.00. *C. J. McIntosh*

Library

LUCY LEWIS, A.B., B.L.S., Librarian.
LUCIA HALEY, A.B., Assistant Librarian.
BERTHA EMMA HERSE, B.S., B.L.S., Reference Librarian.
ELIZABETH MYRTILLA PALM, B.S., Circulation Librarian.
ELIZABETH PROPHET RITCHIE, A.B., B.L.S., Cataloguer.

HARRIET HELEN DUNPHY, A.B., Circulation Assistant.
LAURA CLOUD HALE, Circulation Assistant.
ELZIE VANCE HERBERT, Order Clerk and Stenographer.
DORA MAY HIMMELSBACH, B.Ed., Technical Assistant.
HILDA FRANCIS MARSH, B.A., Circulation Assistant.
JOSEPHINE MORTON, A.B., Technical Assistant.
GERTRUDE CARYL OLDS, B.A., Reference Assistant.
ROSE MARCELENE ROTCHY, A.B., Catalogue and Order Assistant.
FAY FRANCES STAHL, B.A., Technical Assistant.
EVANGELINE THURBER, A.B., Reference Assistant.

Equipment. The library has an excellent building, with provision for expansion, erected for its use in 1918. At present some of the rooms designed for seminar use are occupied as offices by other departments.

The public service rooms include a Reference and Reading room, 150 by 41 feet extending the entire length of the building, a Periodical room, and a Technical Reference room, providing a total seating capacity of 406 readers.

The Reference and Reading room contains a collection of encyclopedias, dictionaries, standard reference books in the different departments of study, and current and bound files of general, literary and economic periodicals. The "Culture collection" of books for general reading is also shelved in this room.

The Technical Reference room, on the first floor, includes bound sets of technical periodicals and the current numbers of technical periodicals. The continuations material includes a collection of the publications of the United States and foreign governments, and the states of the United States, of colleges and learned societies, and other material appearing in numbered series at irregular intervals. Duplicates of the most-used material are kept for circulation and for class reserve work.

Seminar Rooms. Two seminar rooms are maintained at present: A Debate Seminar which is equipped as a work shop for the various intercollegiate and interclass debate teams; and a Faculty Study Seminar equipped with individual desks where important books may be charged to individuals for a limited period.

Catalogues. The library maintains in the reading room a general catalogue of all library books on the campus. This is arranged alphabetically by author, title, and subject. There is also a card catalogue of the publications of the United States Department of Agriculture arranged in the same manner, and a card index to the publications of the state experiment stations, which is a subject catalogue.

Collections. The main working collection of the library is housed in the Library Building, and includes the books provided for the activities of the various schools of the College and the Experiment Station; a good collection of the publications of other colleges and experiment stations; and publications of the departments of Agriculture of the United States and many foreign countries. The library is a designated depository for the publications of the United States Government and the Carnegie Institution of Washington. It owns a collection of more than 2,000 documents received as a gift from the late United States Senator Dolph.

The collection of books on the history of Horticulture is notable, and that on Home Economics is unusually complete for the size of the library.

Departmental collections are limited to the few books that may be constantly required for laboratory purposes, but a liberal charging system permits faculty members to draw books for several weeks or a term when best service can be rendered thereby.

All books are classified and catalogued according to the Dewey decimal system.

Books may be drawn for home use by all officers and students of the College. Books may be kept by the students for two weeks with the privilege of a renewal, and by officers for as long a time as best service to all will permit.

Seniors and graduate students may have access to the stacks for special study if recommended to the Librarian by the department head under whom they are studying.

COURSE

Lib 100. **Library Practice.** This course is designed to give instruction in practical use of the library catalogues and reference

books, by lectures and practical problems requiring the students to use the various indexes, statistical books, encyclopedias, and special reference books. Each student is required to prepare a bibliography of at least twenty-five references on some practical subject.

Required; freshman year; any term; 1 credit; 1 recitation; 1 two-hour laboratory period.

Lucia Haley, Bertha Herse, Evangeline Thurber

Military Science and Tactics

- COLONEL GEORGE WILLIAMS MOSES, United States Army, Retired; Graduate Army School of Line, General Staff School. Commandant of Cadets, Reserve Officers' Training Corps; Professor of Military Science and Tactics.
- LIEUTENANT-COLONEL GEORGE HUBERT WHITE, United States Army, Retired; Graduate Army School of Line. Professor of Military Science and Tactics. In charge of Infantry Unit, Reserve Officers' Training Corps.
- MAJOR DONALD A. ROBINSON, Cavalry, United States Army; Graduate Mounted Service School, Graduate Cavalry School, Graduate Command and General Staff School, Professor of Military Science and Tactics. In charge of Cavalry Unit, Reserve Officers' Training Corps.
- MAJOR HERBERT ODELL, U. S. Field Artillery, Graduate U. S. Military Academy, U. S. Mounted Service School, U. S. Field Artillery Schools, Command and General Staff School. Professor of Military Science and Tactics. In charge of Field Artillery Unit, Reserve Officers' Training Corps.
- CAPTAIN HARLEY LATSON, U. S. Corps of Engineers; Graduate Army Engineer School. Professor of Military Science and Tactics. In charge of Engineer Unit, Reserve Officers' Training Corps.
- CAPTAIN MARCEL A. GILLIS, Infantry, United States Army; Graduate Infantry School. Assistant Professor of Military Science and Tactics. Instructor Infantry Unit, Reserve Officers' Training Corps.
- CAPTAIN JOHN THOMAS MINTON, U. S. Cavalry; Graduate Cavalry School. Assistant Professor of Military Science and Tactics. Instructor Cavalry Unit, Reserve Officers' Training Corps.
- CAPTAIN THOMAS C. McCORMICK, U. S. Field Artillery, Graduate U. S. Field Artillery School. Assistant Professor of Military Science and Tactics. Instructor Field Artillery Unit, Reserve Officers' Training Corps.
- CAPTAIN JOHN WESLEY RUSSEY, U. S. Field Artillery, United States Army; Graduate U. S. Field Artillery School. Assistant Professor of Military Science and Tactics. Instructor Field Artillery Unit, Reserve Officers' Training Corps.
- FIRST LIEUTENANT ARNOLD RICHARD CHRISTIAN SANDER, Infantry, United States Army. Assistant Professor of Military Science and Tactics. Instructor Infantry Unit, Reserve Officers' Training Corps.

- FIRST LIEUTENANT HORACE MCPARLIN WOODWARD, JR., U. S. Cavalry; Graduate Cavalry School. Assistant Professor of Military Science and Tactics. Instructor Cavalry Unit, Reserve Officers' Training Corps.
- LIEUTENANT ROBERT G. LOVETT, Corps of Engineers, United States Army; Graduate Engineer School. Assistant Professor of Military Science and Tactics. Instructor Engineer Unit, Reserve Officers' Training Corps.
- MASTER SERGEANT HERBERT CLARENCE SPEAR, D. E. M. L., (Captain Engineer Section, Officers' Reserve Corps, United States Army). Assistant to Professor of Military Science and Tactics. Instructor Engineer Unit, Reserve Officers' Training Corps.
- MASTER SERGEANT FRANK GEORGE HUNTER, D. E. M. L., United States Army. Assistant to Professor of Military Science and Tactics. Supply Sergeant, Reserve Officers' Training Corps.
- FIRST SERGEANT JOHN HARSCH, Jr., D. E. M. L., United States Army. Assistant to Professor of Military Science and Tactics. Instructor Field Artillery Unit, Reserve Officers' Training Corps.
- FIRST SERGEANT HERBERT GEORGE CROCKER, D. E. M. L., United States Army (Major, Cavalry Section, Officers' Reserve Corps, United States Army). Assistant to Professor of Military Science and Tactics. Instructor Cavalry Unit, Reserve Officers' Training Corps.
- SERGEANT BERT LORING DUNHAM, D. E. M. L., United States Army. Assistant to Professor of Military Science and Tactics. Instructor Field Artillery Unit, Reserve Officers' Training Corps.
- SERGEANT JOHN CARSON WOODBURY, D. E. M. L., United States Army. Assistant to Professor of Military Science and Tactics. Reserve Officers' Training Corps.
- SERGEANT CLARENCE CALVIN WOODBURY, D. E. M. L., United States Army, (First Lieutenant, Infantry Section, Officers' Reserve Corps, United States Army). Assistant to Professor of Military Science and Tactics. Instructor Infantry Unit, Reserve Officers' Training Corps.
- SERGEANT EDWARD MACMANUS, D. E. M. L., United States Army. Assistant to Professor of Military Science and Tactics.
- SERGEANT LAURENCE E. DARLINGTON, D. E. M. L., Assistant to Professor of Military Science and Tactics.
- SERGEANT WILLIAM B. JONES, D. E. M. L. Assistant to Professor of Military Science and Tactics.

The Act of Congress establishing the Agricultural and Mechanical colleges was passed in the midst of the Civil War; it inaugurated the cadet corps and required military training of all able-bodied male students. The object of this requirement was to provide well-trained officers for citizen soldiers. The Act was supplemented on June 3, 1916, by another Act of Congress, passed in the midst of the World War, establishing the Reserve Officers' Training Corps. The object of the Corps is "to qualify students, by systematic and standard training methods, to be commissioned in the Officers' Reserve Corps so that in time of national emergency, trained men, graduates of the College, may lead the units of the large armies on which the safety of the country will depend."

A Distinguished Institution. By order of the War Department, as a result of comparative inspection, the Oregon Agricultural College has been designated a Distinguished Institution in respect to its military training.

R. O. T. C. Basic and Advanced Courses. In the fall of 1917 the War Department established at the Oregon Agricultural College both a Basic Course and an Advanced Course, Senior Division, in the Reserve Officers' Training Corps. The Basic Course covers the first two years of the college military training, enrolling physically fit men of the freshman and sophomore years except those who may be excused by the proper College authorities. The Advanced Course comprises the third and fourth years of college military training, enrolling those men who have completed the Basic Course and who have shown proper interest and aptitude for the training and who are specially selected for further training in advanced work. Once enrolled in the Advanced Course, students are required to carry it to completion as a prerequisite to graduation from this College.

Four Branches of Training. Four branches of military training are offered at the College to qualified students of the Reserve Officers' Training Corps: Infantry, Cavalry, Engineers, and Field Artillery. An excellent R. O. T. C. cadet band offers instruction in band practice. The members of the band who belong to the R. O. T. C. are members of the Infantry Unit.

Uniforms Provided by the Government. All Basic Course members of R. O. T. C. units at this institution are provided by the United States Government with military uniforms including coat, breeches, cap, leggings, flannel shirt, and belt. To protect the College against financial loss from failure to return military equipment, a deposit in a sum to be determined will be required from

each student enrolled in the R. O. T. C., this deposit to be returned to the student when uniform and equipment are returned to the Military department.

The Advanced Course members of the R. O. T. C. are provided by the Government with tailored serge uniforms, including cap, coat, breeches, and leather leggings. An allowance for repairs and cleaning is provided for during the second Advanced Course year. The College holds title to this uniform until the student has been enrolled in the Advanced Course for one full college year of three terms, when the uniform becomes the property of the student.

Commutation of Subsistence. Selected members of the Advanced Course (junior and senior years) of the R. O. T. C., who sign a special contract agreeing to certain conditions, including attendance at one summer camp, are paid a cash commutation of subsistence (board) by the National Government throughout the entire period during which they are pursuing the Advanced Course in the R. O. T. C. This amount varies according to the cash value of the Government standard ration.

Benefits to Students Enrolling in the R. O. T. C. (a) A thorough military education which will fit students upon completion of the four-year course to render efficient service to the nation in time of war as troop leaders and officers.

(b) A maximum of thirty (30) college credits which count toward a degree on graduation.

(c) The free use of the latest model and very finest equipment of Infantry, Cavalry, Field Artillery, and Engineers, issued to this institution by the Government. The value of the Government equipment now on hand at the College is approximately a half million dollars.

(d) Generous and free allowance of both indoor and outdoor rifle ammunition for target practice, with expert instructors and the free use of rifles, target equipment, ranges, etc.

(e) To all students who have completed two full years of R. O. T. C. training, commutation of subsistence at a certain prescribed rate, including months of the summer vacation.

(f) The privilege of attending summer camps (in the nature of a vacation) without expense of any kind. Students attending these camps, in addition to contact with college men from all over the United States, have their entire expenses paid, including transportation, sleeping car accommodations, and an allowance of approximately \$3.00 a day for meals while enroute both ways, an additional complete uniform upon arrival at camp; board, lodging, medical and emergency dental treatment while at camp; 70 cents a

day in cash to those students pursuing the advanced camp course of instruction; a thorough physical examination; an abundance of healthy, recreational amusement and diversion; excellent social attractions carefully supervised; and last, but not least, a course in military instruction of the very highest type and given by specially selected officers who are experts in their particular lines.

(g) The selection of several honor graduates each year (distinguished colleges only, such as is O. A. C. this year) for permanent appointment in the Regular Army of the United States, no further mental examination being required.

(h) A bachelor's degree in Military Science and Tactics to those students successfully completing a curriculum in Military Science and Tactics.

(i) A commission as a Second Lieutenant in the Officers' Reserve Corps of the United States Army upon successful completion of the four-year course.

The Reserve Officers' Training Corps is organized under authority of the Act of Congress of June 3, 1916, as amended by the acts of September 8, 1916, and July 9, 1918.

The primary object of the R. O. T. C. is to provide systematic military training at civil educational institutions for the purpose of qualifying selected students of such institutions as second lieutenants of the Reserve, National Guard, or Regular Army of the United States and the development of high standards of citizenship.

Requirements. In addition to usual home study, four hours of military instruction each week are required for all men students in the two years of the Basic Course, and five hours each week in the two years of the Advanced Course to those students electing to take the Advanced Course.

Military Credits for Graduation. A minimum of 12 credits in Military Science is required of all men for graduation. This comprises 6 credits for each of the first two years' basic work. Nine credits are given for the work of each of the senior and junior years, which is entirely voluntary. This makes a total of 30 credits for the entire R. O. T. C. work. If a student does not secure 12 credits in his first two years, he must continue his military work until this has been accomplished.

Summer Camps. The required summer camp ordinarily comes at the end of the junior year, but may with the authority of the Corps Area Commander and under such regulations as the College authorities may prescribe from year to year, be attended at the end of the sophomore year or deferred until the end of the senior year. Students of the R. O. T. C., who so desire, are offered the

privilege of attending a basic summer camp at the end of the freshman or sophomore year. The U. S. Government pays all necessary expenses. Six college credits are allowed to students majoring in Military Science and Tactics for attendance at basic camp and six credits for attendance at the advanced camps. This makes 42 credits which may be earned by students for military subjects exclusive of Military History.

Cadet Officers. The cadet officers and non-commissioned officers are selected at the beginning of each college year by the Commandant with the approval of the President of the College. Their relative rank and standard in each grade are determined on a basis of military efficiency and scholarship. Cadet commissioned officers are selected from the senior class, sergeants and higher non-commissioned officers from the junior class, and corporals from the sophomore class. The traditions of the College have made it a high honor to stand well in the Military department and the student commanders of the different R. O. T. C. units have invariably been men of superior attainments and character.

Equipment and Staff. The department of Military Science and Tactics has thoroughly modern equipment, furnished by the National Government and valued considerably in excess of half a million dollars. The Armory is one of the largest and finest in the country and affords ample space for the military staff, arms room, assembly hall, and for military instruction in rainy weather.

Military Fraternity. A chapter of the national military fraternity, "Scabbard and Blade," was installed on the campus during the spring of 1920. Membership is limited to those cadet officers who have exhibited unusually fine qualities of leadership including high ideals and gentlemanly conduct.

Degree Curricula. The College offers work leading to the bachelor's degree in Military Science and Tactics. Two curricula are offered as presented below. The first schedule provides a general cultural curriculum including a two-year requirement in either French, Spanish, or German. The second curriculum outlines a general education in Engineering. For a young man who expects to become a specialty salesman, efficiency expert, business manager or salesman in a concern which requires a general knowledge of engineering rather than the more severely technical information included in one of the special engineering curricula, the curriculum offered by the Military department is particularly well adapted. The preparation in Civil Engineering, as given, is sufficiently complete to enable a graduate to follow that profession, if on graduation he so desires. Some additional preparation is necessary in

order to specialize in either Electrical or Mechanical Engineering. Should a young man realize that his bent is toward some specialty in the field of engineering, but upon entering College he does not wish to confine himself to a choice of but one of these branches, it is recommended that he consider the curriculum offered in the Military department with the idea of taking such additional work after graduation as may be necessary properly to fit him for the specialty which he decides at that time to select.

CURRICULUM IN MILITARY SCIENCE AND TACTICS

(B.S. Degree)

Freshman Year

	Term		
	1st	2d	3d
Military Science and Tactics (MS 111, 112, 113, or 121, 122, 123, or 151, 152, 153)	2	2	2
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
French, Spanish, or German	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
Plane Trigonometry (Mth 111)	4	---	---
Elementary Analysis (Mth 131, 132)	---	4	4
Library Practice (Lib 100)	1	---	---
Gymnastics and Calisthenics (PEm 111, 112, 113)	1½	1½	1½
Approved electives	1	2	2
	17½	17½	17½

Sophomore Year

Military Science and Tactics (MS 211, 212, 213, or 221, 222, 223, or 251, 252, 253)	2	2	2
Modern Language (continued from freshman year)	3	3	3
History of Western Civilization II and III (Hst 212, 213)	3	3	---
Recent History of the United States (Hst 126)	---	---	3
Engineering Physics (Ph 111, 112, 113)	3	3	3
Plane Surveying (CE 121, 122, 123)	5	4	5
Gymnastics and Calisthenics (PEm 211, 212, 213)	1½	1½	1½
Approved electives	1	2	1
	17½	17½	17½

Junior Year

Military Science and Tactics (MS 311, 312, 313, or 321, 322, 323, or 351, 352, 353)	3	3	3
Military History of the United States (MS 302)	---	3	---
English Literature (Eng 321, 322, 323)	3	3	3
Commercial Geography (ES 101)	4	---	---
Introduction to Economics (ES 391)	---	3	---
Economic History of Europe (ES 111)	---	---	4
Principles of Accounting I, II, III (FA 101, 102, 103)	3	3	3
Football (PEm 331), Basket-ball (PEm 332), Baseball (PEm 333)	2	2	2
Approved electives	2	---	2
	17	17	17

Senior Year

	Term		
	1st	2d	3d
Military Science and Tactics (MS 411, 412, 413, or 421, 422, 423, or 451, 452, 453)	3	3	3
Military History of the World War (MS 401)	3	---	---
History of British Empire (Hst 411)	3	---	---
History of Latin America (Hst 331)	---	3	---
American Diplomatic History (Hst 421)	---	---	3
Recent Developments in Electricity (Ph 481)	3	---	---
Comparative Governments (PS 402)	---	3	---
International Relations (PS 401)	---	---	4
Elementary Psychology (Psy 301)	3	---	---
Ethics (Eth 482)	---	3	---
Approved electives	2	5	7
	17	17	17

CURRICULUM IN MILITARY ENGINEERING

(B.S. Degree)

Freshman Year

	Term		
	1st	2d	3d
Military Science and Tactics (MS 111, 112, 113, or 121, 122, 123, or 141, 142, 143, or 151, 152, 153).....	2	2	2
Plane Surveying (CE 121, 122, 123)	5	4	5
Engineering Physics (Ph 111, 112, 113)	3	3	3
Linear Drawing and Lettering (ME 111), Elementary Mechanical Drawing (ME 112)	2	2	---
Mechanical Drawing (ME 114)	---	---	2
Library Practice (Lib 100)	---	1	---
Plane Trigonometry (Mth 111)	4	---	---
Elementary Analysis (Mth 131, 132)	---	4	4
Gymnastics and Calisthenics (PEm 111, 112, 113).....	1½	1½	1½
Electives	1	1	1
	17½	17½	17½

Sophomore Year

Military Science and Tactics (MS 211, 212, 213, or 221, 222, 223, or 241, 242, 243, or 251, 252, 253).....	2	2	2
General Chemistry (Ch 101, 102, 103)	3	3	3
Direct Currents (EE 251)	3	---	---
Alternating Currents (EE 252)	---	3	---
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Differential Calculus (Mth 251), Integral Calculus (Mth 252, 253)	4	4	4
Descriptive Geometry (ME 211)	2	---	---
Gymnastics and Calisthenics (PEm 211, 212, 213)	1½	1½	1½
Approved electives	---	2	5
	17½	17½	17½

Junior Year

Military Science and Tactics (MS 311, 312, 313, or 321, 322, 323, or 341, 342, 343, or 351, 352, 353)	3	3	3
Hydrology (Hyd 311), Hydraulics (Hyd 312, 313)	3	3	3
Military History of the United States (MS 302)	---	3	---
Mechanics (MM 351, 352), Strength of Materials (MM 353).....	3	3	3
Roads and Pavements (HE 313)	5	---	---
Masonry and Foundations (CE 372)	---	3	---
Structural Analysis (CE 387)	---	---	2
Approved electives	3	2	6
	17	17	17

	Senior Year		
	1st	Term 2d	3d
Military Science and Tactics, MS 411, 412, 413, or 421, 422, 423, or 441, 442, 443, or 451, 452, 453)	3	3	3
Structural Engineering (CE 482), Structural Design (CE 483), 484)	4	4	5
Economics of Highway Construction (HE 416)	3	....	....
Military History of the World War (MS 401)	3	....	....
National Government (PS 301) .....	....	3	....
Seminar (CE 491, 492, 493)	1	1	1
Water Supply and Sewerage (Hyd 452) .....	....	5	....
Contracts and Specifications (HE 427) .....	....	....	3
Reclamation Engineering (Hyd 413) .....	....	....	3
Commercial Geography (ES 101)	4	....	....
Approved elective .....	....	2	....
	18	18	15

COURSES IN MILITARY SCIENCE AND TACTICS

NOTE: The courses in Military Science and Tactics are arranged in numerical order within the following groups: Military History, Infantry, Field Artillery, Engineer Corps, Cavalry. The periods indicated in each course are exclusive of the time required for outside study.

MILITARY HISTORY

MS 302. **Military History of the United States.** Military history of the English colonies in North America to the time of the Revolution; of the United States of America from the Revolution to the World War.

Junior year; second term; 3 credits; 3 recitations.

MS 401. **Military History of the World War.** Military history of the World War, beginning with the political events which may be considered as the immediate causes of the War, and covering briefly important military events from the outbreak of war to the Armistice of November 11, 1918.

Senior year; first term; 3 credits; 3 recitations.

INFANTRY

MS 111, 112, 113. **Infantry.** First Year Basic Course. This course aims to instruct the student in basic Infantry subjects; to inculcate obedience, decorum, cheerfulness, esprit, and other elements of good discipline with the corresponding physical development; and to lay a sound foundation for the further pursuit of military studies. Instruction includes training of the rifleman; infantry drill; scouting and patrolling; map reading; combat principles; technique of infantry weapons and care of equipment; gallery and range rifle practice; physical training; military courtesy; interior guard duty.

Freshman year; three terms; 2 credits each term; 4 periods.

MS 211, 212, 213. **Infantry.** Second Year Basic Course. This course aims to give students further training in basic Infantry subjects; to inculcate leadership; to build on the knowledge they have already acquired and prepare them to take up the Advanced Course. Instruction includes training of the automatic rifleman and squad leader. Additional subjects lead to qualification for entrance to the Advanced Course: leadership, drill and command; combat principles to develop ability as a leader of a patrol; a rifle squad in attack and defense and in the service of security; technique of Infantry weapons and care of equipment, including instruction in the bayonet; grenades and automatic rifle; physical training; military policy and patriotism; musketry.

Sophomore year; three terms; 2 credits each term; 4 periods.

MS 311, 312, 313. **Infantry.** First Year Advanced Course. Aims to give further training in basic Infantry subjects and in leadership; in clear and logical thinking; to develop tactical judgment; and prepare for further practical training in the Advanced R. O. T. C. Infantry Camp. Scope of instruction: training as rifle section leader and platoon sergeant, with emphasis on the solution of tactical situations; leadership, drill and command to include ability to instruct and lead a rifle section; combat principles to develop ability to lead a rifle section in combat; technique of infantry weapons and care of equipment; the Machine Gun, 37 mm. gun, 3-inch trench mortar; rifle practice; military sketching and map reading; physical training.

Junior year; three terms; 3 credits each term; 5 periods.

MS 411, 412, 413. **Infantry.** Second Year Advanced Course. This course aims to prepare the student for commission as a second lieutenant of Infantry in the Officers' Reserve Corps of the Army of the United States. Scope of instruction: training of platoon leader; tactics of small Infantry units; leadership, drill and command; combat principles; developing ability to apply the principles of combat in the solution of tactical problems to the operation of small Infantry units; military law; military history of the United States; administration; organization; physical training.

Senior year; three terms; 3 credits each term; 5 periods.

FIELD ARTILLERY

MS 121, 122, 123. **Field Artillery.** First Year Basic Course. The aim of this course is to instruct the student in the duties of a cannoneer of Field Artillery. Dismounted drill; military courtesy and discipline; first aid; interior guard duty; drill of a gun squad; care and use of the pistol; gunners' examination; ordnance and material; equitation.

Freshman year; three terms; 2 credits each term; 4 periods.

MS 221, 222, 223. **Field Artillery.** Second Year Basic Course. This course consists principally of the instruction given to the drivers, the technical specialists, and the non-commissioned officers of Field Artillery. Military ceremonies; topography; orientation; motors and motor vehicles; reconnaissance; mounted drill and draft; sub-caliber practice; pistol practice.

Sophomore year; three terms; 2 credits each term; 4 periods.

MS 321, 322, 323. **Field Artillery.** First Year Advanced Course. The object of this course is to ground the student thoroughly in the technical duties of a junior officer of Field Artillery. The theoretical work includes computation of firing data; exterior ballistics, the laws of dispersion, meteorological data and corrections of the moment, action and effects of projectiles and fuzes, terrain board exercises, smoke bomb practice, equitation and hippology, communication and liaison, battery emplacement and camouflage, functions of the various calibers of Field Artillery.

Junior year; three terms; 3 credits each term; 5 periods.

MS 421, 422, 423. **Field Artillery.** Second Year Advanced Course. The work of this year comprises those general subjects which round out the instruction of an officer of Field Artillery. Military law; rules of land warfare; administration and army paper work; property accountability and records; military history and policy of the United States; minor tactics and map problems; field service regulations; current technical publications; mounted instruction, including polo and cross-country riding. The students of this course are required, from time to time, to act as instructors in the basic courses.

Senior year; three terms; 3 credits each term; 5 periods.

ENGINEER CORPS

MS 141, 142, 143. **Engineer Corps.** First Year Basic Course. An elementary course calculated to produce a well trained private of Engineers, including Infantry drill, military courtesy, discipline, arms and equipment, guard duty, rifle marksmanship, cordage and rigging, ponton work, field fortifications.

Freshman year; three terms; 2 credits each term; 4 periods.

MS 241, 242, 243. **Engineer Corps.** Second Year Basic Course. A course of instruction including further training in military fundamentals and such technical subjects as an intelligent corporal of Engineers should possess; Infantry drill and command, musketry and combat principles, rifle and pistol marksmanship, military hygiene, map reading and map making, military explosives and demolitions, and field fortifications.

Sophomore year; three terms; 2 credits each term; 4 periods.

MS 341, 342, 343. **Engineer Corps.** First Year Advanced Course. A course of instruction in the duties of a master sergeant of Engineers, including practical work as drill master in Engineer work and in Infantry drill and command; combat principles, Infantry weapons, military roads and railroads, military bridges, field fortifications.

Junior year; three terms; 3 credits each term; 5 periods.

MS 441, 442, 443. **Engineer Corps.** Second Year Advanced Course. A course in field and garrison duties of a lieutenant of Engineers, including practical work as drill master; Infantry drill and command, combat principles, military administration, military history, military law, fortifications, duties of engineers, military construction in war.

Senior year; three terms; 3 credits each term; 5 periods.

CAVALRY

MS 151, 152, 153. **Cavalry.** First Year Basic Course. A course in the fundamentals of military science and in the duties of a private of Cavalry. Military courtesy and discipline; physical training; Cavalry drill; use of Cavalry weapons; care and handling of arms and equipment; personal hygiene; guard duty and equitation; map reading; Cavalry tactics.

Freshman year; three terms; 2 credits each term; 4 periods.

MS 251, 252, 253. **Cavalry.** Second Year Basic Course. A course of instruction in the duties of a corporal of Cavalry. Organization, military courtesy and discipline; care and handling of arms and equipment; Cavalry drill; small arms firing; musketry; camp sanitation; guard duty; physical training; topography; development and employment of Cavalry equitation; Cavalry tactics.

Sophomore year; three terms; 2 credits each term; 4 periods.

MS 351, 352, 353. **Cavalry.** First Year Advanced Course. A course in military science and tactics calculated to produce well-trained and efficient Cavalry sergeants. Cavalry drill; Cavalry tactics; care of animals; use of Cavalry weapons; field engineering; use of accompanying weapons; musketry.

Junior year; three terms; 3 credits each term; 5 periods.

MS 451, 452, 453. **Cavalry.** Second Year Advanced Course. A course of instruction for the preparation of a lieutenant of Cavalry. Hippology, minor tactics, Cavalry drill and equitation; use of Cavalry weapons; packing; employment of Cavalry in war; administration; military policy; military history of United States; military law; command and leadership. Reserve Corps regulations.

Senior year; three terms; 3 credits each term; 5 periods.

Department of Physical Education for Men

Including Athletic Coaching

WILLIAM ALEXANDER KEARNS, B.S., Director of Physical Education and Intercollegiate Athletics.

PAUL JOHN SCHISLER, Head Coach of Football; Instructor in Football Tactics.

ROBERT HENRY HAGER, Coach of Basket-ball; Associate Professor of Physical Education.

RALPH ORVAL COLEMAN, B.S., Coach of Baseball; Associate Professor of Physical Education.

MICHAEL HENRY BUTLER, Coach of Track and Field Athletics; Trainer of Athletic Teams.

CLYDE WESLEY HUBBARD, B.S., Assistant Coach of Football; Instructor in Physical Education.

ROY SERVIAS KEENE, B.S., Assistant Coach of Football; Instructor in Physical Education.

HOWARD HUNTER TURNER, B.S., Assistant Coach of Football; Instructor in Physical Education.

ROBIN E. REED, Coach of Wrestling.

LOUIS ERNEST KUEHN, Coach of Swimming.

DOROTHY MAE CLARKE, Secretary of the Department.

Vigorous health often determines capacity. This department feels its responsibility in making its contribution to this important part of the life of the men at the College. In addition to giving opportunity for regular required exercise in the various activities, a thorough course in theory, practice, and technique of modern physical education and athletic coaching is offered. The department aims to give opportunity for participation in every recognized branch of physical activity. In line with the present-day tendency, the department recognizes physical education as a profession. The activities include gymnastics, calisthenics, swimming, boxing, wrestling, fencing, and other special and all intercollegiate athletics. A comprehensive intramural program in practically all branches of athletics provides wholesome exercise.

Special Corrective Work. During the second and third terms of each year, classes in corrective exercises are conducted. Points

of physical defect which have been previously discovered in the entrance physical examination of freshmen are corrected for those who care to avail themselves of this special opportunity. This work consists of both class and individual work and consultation. Opportunity is given for personal interviews regarding physical problems.

Intercollegiate Athletics. All intercollegiate athletics is under the jurisdiction of the Board of Control, composed of three members of the faculty, five members of the student body, and one alumnus. Representative teams are organized for baseball, basketball, cross-country running, football, tennis, track, wrestling, and swimming.

Participation during the whole season of sport is accepted for one term credit in Physical Education.

Intramural Athletics. The work in intramural athletics is supervised by a council composed of the Director of Physical Education, Colonel of the Cadet Regiments, President of the Student Body, Editor of the O. A. C. Barometer, and a representative elected by each of the following groups: Fraternities, Clubs, and Independents. The work in intramural athletics is so organized that every student who is physically fit to take part in athletic contests has the opportunity to participate in scheduled competitive sports. "Every O. A. C. man an athlete" is the slogan of the College. For credit, attendance of two hours each week is required of all freshmen and sophomores who elect this work. The activities include: FALL sports (football, soccer, cross-country running, field events, swimming, tennis, indoor baseball), WINTER sports (basketball, track, and field events, wrestling, boxing, handball, volley-ball, swimming, and advanced gymnastics), SPRING sports (baseball, track and field events, tennis, swimming, and cross-country running.)

Compulsory Swimming. All male students are required to pass a swimming examination before graduating from this institution. Every man must be able to swim at least one length (100 feet) of the swimming pool.

Gymnasium Classes. A minimum of two hours per week in physical activity is required of all freshman and sophomore students. Those who enter any of the various branches of intercollegiate athletics or corrective work receive the same credit regardless of the number of hours.

Summary of Oregon Physical Education Law. The law requiring physical education in the public schools of Oregon provides for a minimum of one hundred minutes a week, or an average of

twenty minutes a day for physical training activities in elementary schools. The State Superintendent of Public Instruction has published a special syllabus prepared by a committee of experts, giving the requirements of the law. The law requires the work to consist of activities promoting physical vigor, physical posture, bearing, and mental and physical alertness, self-control, disciplined initiative, sense of patriotic duty and spirit of cooperation under leadership.

Equipment. The Men's Gymnasium provides boxing and wrestling rooms, bowling alleys, and handball and squash courts. The south unit contains the natatorium, one of the finest on the Coast, with a white-tile pool fifty by one hundred feet in size, with a surrounding gallery capable of seating 1,500 spectators. Modern diving boards, electric lights for the bottom of the pool, and refiltration and ultraviolet ray process for keeping the water sterile, are part of the equipment. The east wing has an auxiliary gymnasium for apparatus work, three handball courts, two wrestling rooms, and one large room for volley ball. The main, central unit contains locker and shower rooms, lobby and offices, and the great gymnasium hall with a floor ninety by one hundred and fifty feet in dimensions, with three regulation basket-ball courts. A new balcony which will seat nearly a thousand students has just been completed. The equipment includes all modern gymnasium apparatus and facilities for physical education and recreation.

The Athletic Field. The Oregon Agricultural College field for athletics comprises a new quarter-mile track; varsity football field, with a new steel covered grandstand seating five thousand people and covered bleachers bringing the total seating capacity up to twenty-five thousand; six practice football fields; and soccer and baseball fields for intramural athletics.

There are at present twelve tennis courts which afford excellent facilities for tennis. Four of these courts are of concrete, affording opportunity for playing all the year around.

The Armory, one of the largest of its kind in the United States, provides fine facilities for winter training during inclement weather in football, track, baseball, and various other sports. An indoor clay track, banked at the turns, which is but eight laps to the mile, and the extension clay floor space and high dome roof furnish facilities for conducting large winter track and field meets.

Fee. The official receipt for the gymnasium fee of \$1.75 a term entitles the holder to full privileges of the department, including health examination, locker, use of shower rooms, athletic fields, gymnasiums, etc. A deposit fee of 75c is required for towels.

COURSES

PEm 111, 112, 113. Gymnastics and Calisthenics.

Required of all freshman men; three terms; $\frac{1}{2}$ credit each term; 2 periods.

PEm 121, 122, 123. Hygiene. A series of lectures on general and personal hygiene, infections, industrial, and occupational diseases, especially applied for those in physical education as a profession.

Three terms; 1 credit each term; 1 period.

PEm 141. History of Physical Education. A background to modern physical education methods; a review of the lives of those who have made their contribution to the development of sports, physical training, and recreation; an intimate study of the pioneers in physical training and a review of the most important developments since the beginning. Study of physical education as a profession, bringing it up to the present time.

Elective; 1 credit; 1 period.

PEm 143. First Aid. The emergency treatment of all classes of injuries (until the doctor comes). An advanced course in first aid with emphasis upon the practical use of the knowledge as applied to every-day life in varying occupations. Red Cross certificates will be given.

Third term; 2 credits; 2 periods.

PEm 151, 152, 153. Elementary Swimming. Teaching of beginners, theory of teaching others to swim, using all the strokes known to swimmers. A foundation course for all advanced swimming and diving. Students will be required to feel at home in the water.

Three terms; 1 credit each term; 1 period.

PEm 171, 172, 173. Play, Theory and Normal Practice. Nature and functioning of play, showing value of play as applied to all ages and situations; how to conduct mass games and recreation; philosophy of play in large groups; practice in games suitable for playground, school, and community recreation; methods for conducting and organizing such activities.

Three terms; 3 credits each term; 3 periods.

PEm 211, 212, 213. Gymnastics and Calisthenics.

Required of all sophomore men. Three terms; $\frac{1}{2}$ credit each term; 2 periods.

PEm 243. **Kinesiology.** Essentials of anatomy, study of the muscles and the frame work of the body, the relationship of movements of the body to its mechanism applied to physical education methods. Human manikins are used in connection with teaching this course.

Second term; 3 credits; 3 periods.

PEm 244, 245, 246. **Physical Education Laboratory.** (Gymnasium and field.) Practical training for teachers of physical education. Consists of work within the gymnasium and upon the athletic fields. Opportunity is given for training and instruction in the various types of gymnastic work as well as in the field work of all outdoor teams. Responsibility for conducting this program is given to students in Physical Education under the direct supervision of coaches and instructors. Field notes and complete program used in the form of a daily report are required.

Three terms; 2 credits each term; 4 periods.

PEm 331. **Football.** Fundamentals of football, theory and practice, detail of each position on the team, training and managing, complete technique of developing offensive and defensive tactics, a comparison of the various systems in American intercollegiate football.

Second term; 2 credits; 2 periods.

PEm 332. **Basket-ball.** The coaching and training of basketball teams beginning with fundamentals, passing, dribbling, and pivoting with emphasis put upon the psychology of the game; various methods of defense and offense are covered.

Second term; 2 credits; 2 periods.

PEm 333. **Baseball.** The technique of batting, pitching, baseball strategy and how to play various positions; promoting the game, making schedules, points of the inside baseball game; care and construction of the field; baseball management.

Third term; 2 credits; 2 periods.

PEm 334. **Track and Field.** How to train for the various track and field events; their form and technique; conduct of athletic meets; construction, use, and assembling of all equipment used by participants on the field; development of certain types of individuals for certain events.

Third term; 2 credits; 2 periods.

PEm 372. **Physiology of Exercise.** The physiological features of muscular movements; coordination of spontaneous and rhythmic character; study of fatigue and of the neuro-muscular values in exercise; relationship of muscle conditioning and health to strain

and overwork; program of competitive health promotion for school and community.

Prerequisite: ZP 321. Second term; 2 credits; 2 periods.

PEM 375. **Schoolroom Games and Gymnastics for Rural School Teachers.** The course outlines the work in schools in which all grades take their gymnastic work together, covering syllabus issued by the State Superintendent for use in the schools of Oregon.

Third term; 2 credits; 2 periods.

PEM 431, 432, 433. **Organization and Administration.** Organization and administration of modern physical education department, control of all privileges supervised by the department; correlation of the various branches of work, working hours, schedules, the day's order, citizens' committee help, assembling volunteer assistants, and a balanced program.

Three terms; 2 credits each term; 2 periods.

PEM 441, 442. **Athletic Training.** (Therapeutics.) Study of the diet; control and apportionment of work and rest, relation to individuals and teams to accomplish a given objective; massage; the use of tape and various protections from injury in athletic contests, their prevention and cure; comparison of various successful training methods applied to varying branches of interscholastic and collegiate sport.

First and second terms; 3 credits each term; 3 periods.

PEM 483. **Anthropometry.** The science of measurements, the history of physical measurements, their relation to the development of the human body in play and modern physical education program. Diagnosis and corrective inspection. Present-day practice in physical measurements.

Third term; 1 credit; 1 period.

Physical Education for Women

EDNA AGNES COCKS, A.M., Professor and Director of Physical Education for Women.

ETTA GABLE LUNT, Secretary of the Department.

DORIS MABEL THORNELY, Assistant Professor of Physical Education for Women.

BERNICE BALLANCE, A.B., Instructor in Physical Education for Women.

HARRIET FOREST MOORE, M.S., Critic Instructor in Physical Education for Women.

LOIS JOHNSON RANKIN, A.B., Instructor in Physical Education for Women.

NETTIE LAURA STURGES, A.B., Instructor in Physical Education for Women.

RUTH THAYER, B.S., A.B., Instructor in Physical Education for Women.

The aim of this department is to bring each student to her best possible physical condition, and by careful training to correct faulty posture, to aid in the formation of habits of hygienic living, to establish a normal condition in the circulatory and respiratory systems, to secure bodily vigor, and to attain a healthy and symmetrical development.

Special Corrective and Medical Gymnastics. Students who are shown by physical examination to be unfit for the work of the regular classes in gymnastics and sports, are assigned to corrective or restricted classes where the work is light and emphasis is laid on correct breathing and posture, relaxation, and rest; or, whenever necessary, students are given private work in medical gymnastics according to individual needs. The physical condition of each student is carefully diagnosed and supervised. The instructors encourage conferences concerning matters of health and personal hygiene and cooperate with the resident physician in all cases.

Requirements. Work in Physical Education is required of all freshmen and sophomores four periods a week, and of all juniors and seniors and special students two periods a week, unless a deferment has been granted by the head of the department or unless excuse is granted for physical reasons.

Examinations. All students on entering are required to take a medical examination by the Medical Adviser, and a physical ex-

amination by the Professor of Physical Education for Women. Those failing to meet the appointment scheduled will be subject to a fine of \$1.00.

Uniforms. The gymnasium uniform consists of an all-black suit, black cotton hose, and black gymnasium shoes. The shoes can be purchased in Corvallis, but the suits must be ordered at the gymnasium office at the time of registration. The uniforms for out-of-doors consist of a short, full, white wash skirt, white middie, and sport shoes or tennis shoes. Black ballet costumes and ballet shoes are used in the aesthetic dancing classes (consult instructor in Dancing). A regulation swimming suit is used and must be ordered at the gymnasium office.

Fee. A gymnasium fee of \$1.50 a term is charged for use of showers, lockers, towels, medical supplies for injuries, etc. Those registered in swimming pay \$0.50 extra.

Equipment. The Women's Gymnasium has floor space for regular gymnasium work, a balcony running-track and playing space for basket-ball and other games. On the main floor are found horizontal bars, vaulting horses and bucks, parallel bars, swinging rings, traveling rings, Swedish box, stall bars, climbing ropes, ladders, dumb bells, Indian clubs, and wands. There are lockers and dressing rooms for all needs and shower-bath rooms where hot and cold water is available throughout the year. The athletic field provides for such games as basket-ball, field hockey, soccer, tennis, baseball, and field ball. The swimming pool in Shepard Hall is under the direction of the department of Physical Education for Women and is supervised by an instructor.

COURSES

REQUIRED COURSES

PEw 111, 112, 113. **Gymnastics.** Practical floor work in gymnastics. The movements are chosen and formed with the object of giving the body an all-round and harmonious development. Combines floor, marching, apparatus work, and games. Required of all freshman women; the other two required hours may be selected from the general elective courses.

Required of all women; freshman year; three terms; $\frac{1}{2}$ credit each term; 2 periods.
Bernice Ballance, Nettie Sturges

PEw 114, 115, 116. **Restricted Gymnastics.** A course of modified gymnastics, stressing posture training; also individual exercises as the need may demand.

Required of all women not taking PEw 111, 112, 113 or PEw 117, 118, 119; freshman year; three terms; $\frac{1}{2}$ credit each term; 2 periods.
Nettie Sturges, Doris Thornely

PEw 117, 118, 119. **Corrective Gymnastics.** A lighter form of individual gymnastic movements for those students not physically able to take the regular gymnasium work or the restricted gymnastic work.

Required of all women not taking PEw 111, 112, 113 or PEw 114, 115, 116; freshman year; three terms; $\frac{1}{2}$ credit each term; 2 periods.
Nettie Sturges, Doris Thornely

PEw 121. **Social Ethics.** This course is designed to help as a transition between the social life of the home and high school and that of the college. It consists of a series of lectures during the fall term, together with a limited amount of reading.

Required of all women; freshman year; first term; 1 credit; 1 period.
Kate W. Jameson

PEw 122. **Hygiene.** Lectures covering personal and general hygiene, including care of the skin, hair, teeth, nails; care of the special senses, as eye, ear, nose, and throat; study of rest, exercise, and recreation.

Required of women; freshman year; second term; 1 credit; 1 period.
Edna A. Cocks

PEw 211, 212, 213. **Gymnastics.** A continuation of PEw 111, 112, 113. Required of all sophomore women; the other two required hours may be selected from the general elective courses.

Required of all women; sophomore year; three terms; $\frac{1}{2}$ credit each term; two periods.
Bernice Ballance, Nettie Sturges

PEw 214, 215, 216. **Restricted Gymnastics.** A continuation of PEw 114, 115, 116. Required of all sophomore women not taking PEw 211, 212, 213 or PEw 217, 218, 219; sophomore year; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Nettie Sturges, Doris Thornely

PEw 217, 218, 219. **Corrective Gymnastics.** A continuation of PEw 117, 118, 119. Required of all sophomore women not taking PEw 211, 212, 213 or PEw 214, 215, 216; sophomore year; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Nettie Sturges, Doris Thornely

GENERAL COURSES

PEw 131, 132, 133. **Dancing.** (A) Elementary Aesthetic Dancing. A thorough foundation for artistic dancing, consisting of bar

work, elementary technique, rhythmic movements and simple aesthetic dances. (B) Elementary Folk Dancing. Folk dances of all nations, ranging in character from the song play to the more complicated national dances.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 134, 135, 136. **Gymnastic Dancing.** Steps progressing from the simple to complex movements.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 137, 138, 139. **Apparatus Work.** This course consists of work with both light and heavy apparatus, such as rings, ladders, stall bars, vaulting box, and mats.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 141, 142, 143. **Elementary Athletics.** (a) Tennis. (b) Hockey. (c) Volley-ball. (d) Basket-ball. (e) Baseball. (f) Field and Track. (g) Fieldball. (h) Soccer. These courses are designed to instruct the student in the fundamental rules of each sport, to form habits of healthful recreation and to instill sportsmanship.

Elective; three terms; $\frac{1}{2}$ credit each term; two periods.

Lois Rankin, Ruth Thayer

PEw 151, 152, 153. **Elementary Swimming.** This course includes the first principles of swimming and diving. The crawl stroke, elementary back stroke, side stroke, and breast stroke are taught.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Lois Rankin, Ruth Thayer

PEw 231, 232, 233. **Dancing.** (A) Intermediate Aesthetic Dancing. Bar work of the more advanced type, combinations, adagio and dances. (B) Intermediate Folk Dancing. Both courses are a continuation of PEw 131, 132, 133.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 237. **Hand Apparatus.** Work with Indian clubs, dumb bells, wands, balls, and reeds.

Elective; first term; $\frac{1}{2}$ credit; 2 periods.

Lois Rankin

PEw 238. **Fencing.** Includes individual and class instruction in foil and saber fencing; methods of single and double rank formation; salutes and fencing bouts.

Elective; second term; $\frac{1}{2}$ credit; 2 periods.

Lois Rankin

PEw 239. **Archery.** A course in the principles and fundamentals of archery.

Elective; third term; $\frac{1}{2}$ credit; 2 periods. *Lois Rankin*

PEw 241, 242, 243. **Advanced Athletics.** (a) Tennis. (b) Hockey. (c) Volley-ball. (d) Basket-ball. (e) Baseball. (f) Field and Track. (g) Field-ball. (h) Soccer. These courses include advanced study and application of the rules of each sport and the development of individual skill and technique, and of team-play.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Lois Rankin, Ruth Thayer

PEw 251, 252, 253. **Intermediate Swimming.** This course takes up the strokes in greater detail than the elementary course, emphasizing form. The plunge for distance, the racing start and elementary Life-Saving are included.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Lois Rankin, Ruth Thayer

PEw 311, 312, 313. **Advanced Gymnastics.** An advanced course in gymnastics for students who have completed courses PEw 111, 112, 113 and PEw 211, 212, 213. Includes marching, floor and apparatus work of a more difficult type.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 331, 332, 333. **Dancing.** (A) Advanced Aesthetic Dancing. This course consists of advanced bar work and technique; toe technique and dances; adagios; the creating and producing of original dances and ballets. (B) Advanced Folk Dancing. Both courses are a continuation of PEw 231, 232, 233.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Bernice Ballance

PEw 351, 352, 353. **Advanced Swimming.** A course for those having completed courses PEw 151, 152, 153 and PEw 251, 252, 253, consisting of more advanced work.

Elective; three terms; $\frac{1}{2}$ credit each term; 2 periods.

Lois Rankin, Ruth Thayer

SPECIAL COURSES

PEw 245. **First Aid to the Injured.** This course covers emergency treatment of wounds, shocks, fainting, hemorrhage, burns, sunstroke, sprains, fractures, and poisons; the use of bandages; care of the wounded.

Elective; third term; 2 credits; 2 periods.

Edna A. Cocks

PEw 261. **History of Physical Education.** A course covering the origin and development of physical education including mention of leading educators.

Elective; first term; 3 credits; 3 periods. *Ruth Thayer*

PEw 271. **Theory of Play.** A study of the nature of the child; the nature and function of play; the value of play; aims and spirit in the conduct of play.

Elective; first term; 3 credits; 3 periods. *Edna A. Cocks*

PEw 272. **Organization and Administration of Physical Education and Recreation.** Development, organization, and management of Physical Education; the playground movement; construction and equipment; use of apparatus; government and discipline.

Elective; second term; 3 credits; 3 periods. *Edna A. Cocks*

PEw 273. **Pageantry and Costuming.** The course consists of lectures, floor work, and outside reading and reference work; a study of pageants, designing of pageant costumes, choice and arrangement of music and drills suitable for exhibition purposes.

Elective; third term; 3 credits; 3 periods. *Bernice Ballance*

PEw 275. **Playground and Gymnastic Games.** A study and analysis of games for the playground and gymnasium; lectures on the theory of games; reference reading and reports; practical working of games.

Elective; second term; 3 credits; 3 periods. *Bernice Ballance*

PEw 344, 345. **Kinesiology.** This course comprises a study of the action of muscles and their mechanics; an analysis of gymnastic exercise and the effect of exercise on posture.

Prerequisites: Anatomy and Physiology. Elective; first and second terms; 3 credits each term; 3 periods. *Doris Thornely*

PEw 346. **Physiology of Exercise.** A study of the physiological effect of exercise on the neuro-muscular, cardio-vascular and respiratory systems and metabolism. The phenomena of energy, rest, overwork, fatigue, stiffness, second wind, etc., will be considered in relation to exercise.

Elective; third term; 3 credits; 3 periods. *Doris Thornely*

PEw 361, 362, 363. **Principles and Methods of Physical Education.** This course takes up the organization, leadership, and administration of Physical Education; the preparation for teaching; the theory of handling classes; reference reading.

Elective; three terms; 3 credits each term; 3 periods.

Edna A. Cocks

PEw 376. **Theory of the Coaching of Athletics.** This course covers the principles of the coaching of the more highly organized

games such as tennis, hockey, volley-ball, basket-ball, baseball, field and track athletics and soccer. It includes lectures, organization of each game, care of equipment and reference reading.

Elective; third term; 3 credits; 3 periods. *Lois Rankin*

PEw 423. **Advanced Hygiene and Sanitary Science.** This course takes up the vital points in hygiene and sanitation and includes the theory of teaching the subject in the elementary and the high schools.

Elective; third term; 2 credits; 2 periods. *Edna A. Cocks*

PEw 441. **Massage.** This course takes up the theory and practice in different massage movements and a study of the effect of massage on the different systems of the body.

Prerequisites: Anatomy and Kinesiology. Elective; first term; 3 credits; 2 lectures; 3 laboratory periods. *Doris Thornely*

PEw 442. **Physical Diagnosis and Anthropometry.** This course takes up the theory and practice of different methods of medical and physical diagnosis to detect normal and abnormal functional and structural conditions, body measurements and strength tests.

Prerequisites: Anatomy and Kinesiology. Elective; second term; 3 credits; 2 lectures; 3 laboratory periods. *Doris Thornely*

PEw 443. **Therapeutics.** This course takes up work in active and passive exercises as applied to abnormal health conditions. Orthopedic gymnastics, dealing with deformities, especially spinal curvatures and foot conditions, their prevention and treatment. Planning prescription of exercises and practice in the school clinic.

Prerequisites: Anatomy and Kinesiology. Elective; third term; 3 credits; 2 lectures; 3 laboratory periods. *Doris Thornely*

PEw 451, 452, 453. **Physical Education Seminar.** An advanced course for students taking special work in physical education. Discussions of vital problems in physical education; reviews and reports of books and magazine articles. Each student is required to write a term thesis.

Elective; three terms; credits and hours to be arranged. *Edna A. Cocks*

PEw 464, 465, 466. **Practice Teaching.** This course consists of the actual handling of classes in the Corvallis senior and junior high schools and elementary schools, using the fundamentals and methods of the course PEw 361, 362, 363. Principles and Methods of Physical Education; the making of lesson plans; reference reading.

Elective; three terms; credits and hours to be arranged. *Harriet F. Moore*

School of Music

- WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
- PAUL PETRI, Director of the School of Music; Professor of Singing and Conductor of Choruses.
- LILLIAN JEFFREYS PETRI, Professor of Piano and Musical Theory.
- MARGUERITE MACMANUS, Professor of Stringed Instruments and Conductor of Orchestras.
- HARRY LYNDEN BEARD, B.S., Professor of Band Instruments and Conductor of Band.
- FLORENCE BOWDEN, Instructor in Cello, Violin and Small Strings; Assistant Conductor of Orchestras and Mandolin and Guitar Club.
- JEANNETTE BOYER XANTEN, Assistant Instructor in Singing.
- BYRON ARNOLD, A.B., Instructor in Organ, Piano, Musical History and Theory.
- HULDA HARTUNG, Assistant Instructor in Piano and Theory. The Dunning System for Beginners.
- WILLIAM VALENTINE SKINNER, Assistant Instructor in Wood Wind Instruments.

The School of Music offers courses to those who wish to make Music a life work and also to those students in the other schools of the College who wish to take advantage of the opportunity to continue their musical studies along with their other work.

The staff has been selected with great care and numbers among its members musicians of the highest rank in the Northwest, who, through study and concert work in the large musical centers of this country and Europe bring to the School the highest ideals prevailing in these centers. The assistant instructors are chiefly Artist Students of the heads of the departments and instruct in the same methods as their superiors, thus preparing the less advanced students for effective study under the principal instructors when they later enter the upper classes.

Instruction is mainly private, and although the fees charged are much lower than those of private schools or conservatories, the School of Music affords added opportunity of the invigorating college life and the other educational and aesthetic advantages offered by a large college. The School is a self-supporting department of the College.

Scholarships. A number of free scholarships in the School of Music are available to worthy, talented pupils. Examinations

for these are held during the first week of the fall term. Application must be made to the Director.

Curriculum. A four-year curriculum, leading to a diploma, is offered by the School of Music, covering all of the studies making for a practical, well-rounded musical education. "Minor" groups of courses to be pursued in conjunction with certain of the other schools in the College are in preparation.

Equipment. The School of Music occupies the entire top floor of the Administration Building. Ample facilities for teaching and practicing in well heated, ventilated, and lighted rooms are provided.

Musical Organizations. The musical organizations of the College are under the direction of the School of Music. The standards have been developed to afford music of the highest type.

The College Band. Membership in the R. O. T. C. Band is open to any student who can pass a satisfactory examination in the elements of music and ability to perform on his instrument. Attendance at rehearsals and individual practice are required. Members must furnish their own instruments, except basses, baritones, altos, and drums, which are furnished by the College. Instruments must be in low pitch.

The Orchestras. Students and faculty members who play violin, viola, cello, or double bass, as well as wood-wind and brass instruments, will be admitted to membership in one of the four orchestras maintained by the School of Music. Admittance may be gained by passing a test conducted in private by the conductor of the orchestras. The student is then classified and assigned to the orchestra best suited to him. The Advanced Orchestra prepares regular symphonic programs and gives a concert each term with assisting soloists. The Preparatory Orchestra confines itself to compositions of lesser difficulty and from its ranks fills vacancies in the Advanced Orchestra. The Junior and Beginners' Orchestras devote their time to the elements of sight-reading, knowledge of orchestral instruments, recognition of musical symbols, and the principles of ensemble playing. Membership in all the orchestras is free.

The Glee Club. Membership in the Glee Club is determined by the conductor upon personal examination of the candidates and is open to any male student of the College who can pass the required test. The club participates in many campus functions, and a tour is usually undertaken annually. Programs of male choruses, glees,

and compositions of a lighter nature are prepared, and in conjunction with the Madrigal Club a joint program is given each year, such as a light opera or other work of recognized merit for mixed voices. Regular attendance at rehearsals is required.

The Madrigal Club. Membership in this organization is open to any young woman student of the College who can pass a test similar to the one for the Glee Club. Compositions for womens' voices of various types are studied, and concerts are given alone and in conjunction with the Glee Club at various times during the year.

The Mandolin and Guitar Club. To the student who is proficient on instruments of this nature is given an opportunity to play in ensemble under the direction of the instructor in small stringed instruments. Regular weekly rehearsals are held.

Concerts. Under the direction of the School of Music a series of Sunday afternoon Vesper Concerts is presented throughout the college year. The College Orchestra, Glee Club, and Madrigal Club give programs at once entertaining and educational in character. Recitals by members of the faculty and of the more advanced students are also given. These vesper concerts contribute materially to the spiritual and cultural life of the entire student body of the College. There is no admission charge.

Arrangements are also made for the appearance of some of the great artists of international fame during the year, for which a reduced charge is made for the students of the College.

Admission. Entrance requirements for major students in Music are the same as for students in other major curricula throughout the College as explained on pages 33-36. Entrance credentials should in all cases be submitted to the Registrar and a registration permit secured, before consulting with the Director of the School of Music for assignment to classes and instructors.

By arrangement with the Director, students may earn six elective credits in Music applicable to graduation from any degree curriculum.

An applicant for instruction at least twenty-one years of age who cannot meet the regular requirements, but who has the necessary training and experience profitably to pursue courses of college grade, may, with the approval of the Director, be registered as a special student. A special student is not a candidate for a diploma.

Other persons desiring to pursue work in Music may arrange, through the Director, with members of the Music faculty for instruction. These persons are not regularly registered in the College and are not subject to instructional fees or regulations, except those applying especially to Music.

Regulations. Any student in the Oregon Agricultural College with a satisfactory record in scholarship in his major courses may elect at least one hour a day in music, by arrangement with the Director of the School of Music. The authority to assign all applicants for music instruction is vested solely in the Director, who must be consulted for the arrangement of details of registration, or at any time when information is required that pertains to study in the various departments of the School.

Students in the School of Music may enter classes in other departments of the College; and they are encouraged to take at least one course throughout the college year in addition to their regular music work. Students may enter at any time, but it is advantageous to register at the opening of a term.

Young women whose homes are not in Corvallis are expected to live in the dormitories, where they are under the supervision of the Preceptress. Outside rooming and boarding places may be obtained, subject to the approval of the Dean of Women. The rates for board and room are listed on pages 42-43.

Students registered for study in the regular courses of the Oregon Agricultural College School of Music are subject to the same rules and regulations as other students.

No student registered in the School of Music will be permitted to play or sing in public without the consent of the instructor.

No student is permitted to omit lessons or practice without sufficient excuse and no refund will be made for absence from lessons or practice or for discontinuance, except in cases of severe personal illness; for such unavoidable absence lessons may be made up only by appointment, and before the expiration of the term. Students missing lessons by reason of severe illness attested by the official Medical Adviser or other acceptable medical authority, are strongly advised immediately to notify all instructors concerned. Loss of instruction time caused by failure to give such notification will be charged against the lesson account of the student.

Lessons falling on legal holidays, or on special holidays petitioned for by the student body or by special student organizations, which may be granted by the College authorities, will not be made up unless arranged for with the instructor before said holiday, and duly approved by the Director.

Students are not permitted to transfer tuition accounts to others, nor to receive credit for tuition fees beyond the assigned registration period, except in cases of severe personal illness, or similar extreme necessity, attested by the Medical Adviser, and then only by making suitable arrangements with the Director.

Students are required to inform themselves of all rules governing the School of Music by reference to the College catalogue, the bulletin boards in the Administration Building, and special notices issued from time to time by the Director. The letter and the spirit of all regulations will be consistently and impartially enforced, and it should be definitely understood that instructors are not expected to keep students informed of their obligations.

The college year in the School of Music, as in other schools of the College, consists of thirty-six weeks, divided into terms of approximately twelve weeks each. The Summer Session offers special opportunities for intensive study in Music. Announcement of the summer courses offered is by special bulletin obtainable from the Director of the Summer Session.

Tuition. Private lessons are one-half hour in length. Class lessons are fifty minutes in length.

	Per term	
	One lesson a week	Two lessons a week
Piano		
Mrs. Petri	\$24.00	\$48.00
Mr. Arnold	18.00	36.00
Miss Hartung	15.00	30.00
Miss Hartung. The Dunning System for Beginners.....	.....	24.00
Organ		
Mr. Arnold	24.00	48.00
Singing		
Mr. Petri	24.00	48.00
Mrs. Xanten	18.00	36.00
Violin, Viola, Cello		
Mrs. MacManus	24.00	48.00
Miss Bowden	15.00	30.00
Banjo, Guitar and other Small Strings		
Miss Bowden	15.00	30.00
Band Instruments		
Mr. Beard, Mr. Skinner	15.00	30.00
Theory and Allied Subjects, Private Instruction	24.00	48.00
Class Instruction, not less than four in a class accepted; 1 hour a week, a term .....	.....	7.50

Piano and Organ Rental.

Piano	
$\frac{1}{2}$ hour a day, a term (for Singing students only)	\$ 3.00
1 hour a day, a term	5.00
1 hour a day, a term (without use of piano)	2.50
2 hours a day, a term	7.50
3 hours a day, a term	10.00
4 hours a day, a term	12.50
Organ	
1 hour a day, a term	15.00
2 hours a day, a term	20.00
3 hours a day, a term	25.00

For further information address PAUL PETRI, Director of the School of Music, Oregon Agricultural College, Corvallis, Oregon.

CURRICULUM IN MUSIC

(Music Diploma)

PIANO, VIOLIN, SINGING

Freshman Year

	Term		
	1st	2d	3d
Piano (Mus 131, 132, 133) or Singing (Mus 141, 142, 143) or Violin (Mus 151, 152, 153)	6	6	6
Harmony I, II, III (Mus 111, 112, 113)	3	3	3
Sight-singing and Ear-training (Mus 147, 148)	1	1	---
History of Music (Mus 121, 122, 123)	1	1	1
English Composition (Eng 101, 102), Technical Composition (Eng 103)	3	3	3
Library Practice (Lib 100)	---	---	1
Gymnastics (PEW 111, 112, 113) (Women)	1	1	1
Social Ethics (PEW 121), Hygiene (PEW 122) (Women)	1	1	---
Gymnastics and Calisthenics (PEM 111, 112, 113) (Men)	($\frac{3}{2}$)	($\frac{3}{2}$)	($\frac{3}{2}$)
Military Science and Tactics (Men)	(2)	(2)	(2)
	16	16	15

Sophomore Year

Piano (Mus 231, 232, 233) or Singing (Mus 241, 242, 243) or Violin (Mus 251, 252, 253)	6	6	6
Harmony IV, V, VI (Mus 211, 212, 213)	3	3	3
French or German	3	3	3
Gymnastics (PEW 211, 212, 213) (Women)	1	1	1
Gymnastics and Calisthenics (PEM 211, 212, 213) (Men)	($\frac{3}{2}$)	($\frac{3}{2}$)	($\frac{3}{2}$)
Military Science and Tactics (Men)	(2)	(2)	(2)
Electives	3	3	4
	16	16	17

Junior Year

Piano (Mus 331, 332, 333) or Singing (Mus 341, 342, 343) or Violin (Mus 351, 352, 353)	6	6	6
Strict Counterpoint (Mus 311)	3	---	---
Canon and Fugue (Mus 312)	---	3	---
Modern Harmony (Mus 313)	---	---	3
French or German	3	3	3
Physical Education (Women)	1	1	1
Electives	3	3	3
	16	16	16

Senior Year

Piano (Mus 431, 432, 433) or Singing (Mus 441, 442, 443) or Violin (Mus 451, 452, 453)	6	6	6
Modern Harmony (Mus 411)	3	---	---
Composition (Mus 412, 413)	---	3	3
Pedagogy (Mus 421)	---	1	---
Physical Education (Women)	1	1	1
Electives	6	5	6
	16	16	16

THEORY**COURSES****HARMONY**

Mus 111. Harmony I. Laws of overtone; origin and history of diatonic scale system; thorough scale drills, playing, singing, writing; tetrachord comparison; melodic principles developed from tetrachord relations, and awakening of harmonic consciousness. Practical application to student's special instrument.

Required in Music; freshman year; first term; 3 credits; 2 periods.

Mus 112. Harmony II. Intensive interval drills, and ear-perception and key identification of these; cadences; melodic dictation; writing of bassvoice to melodies; triads, dominant and diminished seventh chords; recognition of by-tones; keyboard drills, or parallel on student's special instrument; analysis of intervals and primary chords in easy repertoire pieces; ear drills.

Prerequisite: Mus 111. Required in Music; freshman year; second term; 3 credits; 2 periods.

Mus 113. Harmony III. Inversion of intervals; all key-chords and their inversions; two- and three-part singing and writing; free harmonization of melodies using tonic, dominant, subdominant, and supertonic; original melody writing; interkey relation, leading to simple transposition and modulation; analysis of form and harmonic structure of simple pieces in students' repertoire; ear drills.

Prerequisite: Mus 112. Required in Music; freshman year; third term; 3 credits; 2 periods.

Mus 121, 122, 123. History of Music. Evolution of music from the ancient and medieval systems; the Gregorian Chant; the classical period through Bach and Beethoven; the classical musical forms; the romantic and modern periods; the opera. The lectures are liberally supplemented through the use of the phonograph and other means.

Required in Music; elective to others; freshman year; three terms; 1 credit each term; 1 lecture.

Mus 147, 148. Sight-singing and Ear-Training. Relative pitches to recognize intervals, both at sight and by sound; writing from tonal dictation, singing melodies, rhythmic problems, note values, pulsation, using well-known rhymes; rhythmic dictation; writing melodies from dictation.

Required in Music; elective to others; freshman year; first and second terms; 1 credit each term; 1 recitation.

Mus 211. **Harmony IV.** Continuation of Mus 113. Use of secondary chords in free harmonization of melodies; ear-perception of these as substitutes for primary chords; four-voice treatment of original melodies; ear recognition of fundamental harmonies of pieces chosen from students' repertoire; analysis of Bach preludes and other material of medium grade.

Prerequisite: Mus 113. Required in Music; sophomore year; first term; 3 credits; 2 periods.

Mus 212. **Harmony V.** Free harmonization of melodies that modulate; ear drills in recognition of key changes; harmonic and form analysis of Bach inventions, and material chosen from students' repertoire; keyboard modulation from chord-patterns; four-voice harmonization at keyboard or other practical application on student's special instrument; study of Schubert songs; free harmonization of their melodies, with later comparison with the original.

Prerequisite: Mus 211. Required in Music; sophomore year; second term; 3 credits; 2 periods.

Mus 213. **Harmony VI.** Continuation of Mus 212. Altered chords; free harmonization of entire periods from works of the masters, with later comparison with the original; study of modulation methods used by the masters; melodic phrase given by dictation; original answer written by student; analysis of Bach fugues, Beethoven sonatas, and works chosen from repertoire.

Prerequisite: Mus 212. Required in Music; sophomore year; third term; 3 credits; 2 periods.

Mus 311. **Strict Counterpoint.** Analysis of Bach fugues continued. Analysis of Brahms and Chopin sonatas and material in use by students.

Prerequisite: Mus 213. Required in Music; junior year; first term; 3 credits; 2 periods.

Mus 312. **Canon and Fugue.** Analysis of Beethoven symphonies and other works chosen from students' practical courses.

Prerequisite: Mus 311. Required in Music; junior year; second term; 3 credits; 2 periods.

Mus 313. **Modern Harmony.** Modern interval successions; modern chord structure and resolution; scales other than diatonic; free harmonization of melodies with contrapuntal voice written in; analysis of compositions by Grieg, MacDowell, Debussy; ear drills in recognizing characteristic qualities of different periods of composition.

Prerequisite: Mus 312. Required in Music; junior year; third term; 3 credits; 2 periods.

Mus 411. **Modern Harmony.** Continuation of Mus 313. Dual chord structure; lack of tonality; lack of melody and definite form traced and analyzed; works reharmonized and compared with original treatment; analysis of compositions by Ravel, Palmgren, Stravinsky, and others.

Prerequisite: Mus 313. Required in Music; senior year; first term; 3 credits; 2 periods.

Mus 412. **Composition.** Setting of poems chosen at first by the teacher, later by the student; original composition in old dance forms; analysis of Bach Suites; analysis of Song classics, especially of dramatic songs with view of absorbing means of dramatic expression.

Prerequisite: Mus 411. Required in Music; senior year; second term; 3 credits; 2 periods.

Mus 413. **Composition.** Original sonata and any other creative work suitable to the powers of self-expression of the student, particularly for his own chosen instrument; ear work in identifying work of different composers by general characteristics; Liszt, Wagner and Chopin especially discussed.

Prerequisite: Mus 412. Required in Music; senior year; third term; 3 credits; 2 periods.

Mus 421. **Pedagogy.** For major students in Piano or Violin. Upbuilding of comprehensive musicianship; teaching the pupils to hear phrase and chord formations; to recognize key changes; to transpose; to memorize consciously in form; psychology of cultivating earnest effort in pupils; inculcating a sense of joy in earnest effort; weighing and sifting teaching material; arrangement according to grade of difficulty.

Senior year; second term; 1 credit; 1 period either private or class instruction, as arranged.

Mus 422. **Orchestration.** The various instruments of the orchestra; their range and functions; systematic arrangement of music for the orchestra; orchestral scores.

Senior year; any term; 2 credits; 1 private or class instruction period, as arranged.

Electives

Courses similar to those for major students in Music arranged for students registered in other schools; of a less intensive nature and requiring less outside preparation.

Mus 111a, 112a, 113a. **Harmony I, II, III.**

Elective; three terms; 1 credit each term; 1 period.

Mus 211a, 212a, 213a. **Harmony IV, V, VI.**

Elective; three terms; 1 credit each term; 1 period.

PIANO

COURSES

Mus 131, 132, 133. **Piano.** Thorough foundation in technique developed upon highly scientific basis of mental control of pianistic movements, attained through the use of special fundamental exercises; Hanon, Lejeal, Czerny, and Bach two-part inventions, Haydn sonatas, and other pieces of suitable grade, according to the individual need of the student. All pieces to be played from memory. Tests given in class lessons to accustom the student to play before others. No credits will be allowed on this part of the major course unless a satisfactory practical examination is passed at the end of the third term.

Required in Piano; freshman year; 3 terms; 6 credits each term; 2 private lessons; 3 hours daily practice.

Mus 231, 232, 233. **Piano.** Continuation of fundamental training, using as a text Petri's "Mind Over Muscle." Hanon, Cramer, Kullak, Bach three-part inventions, English and French suites, Mozart and Beethoven sonatas; compositions by composers of the classical and romantic periods and others selected according to the special need of the student.

Prerequisite: Mus 133. Required in Piano; sophomore year; 3 terms; 6 credits each term; 2 private lessons; 3 to 4 hours daily practice.

Mus 331, 332, 333. **Piano.** Continuation of fundamental technical training; Clementi, Henselt, Liszt studies, Bach well-tempered clavier, Beethoven sonatas and repertoire pieces of all periods suitable to the needs of the student, particularly the larger works of Schumann, Chopin, Grieg, MacDowell and through Debussy, Rachmaninoff, Dohnanji, Palmgren, and others to the ultra-moderns where these can be comprehended.

Prerequisite: Mus 233, or equivalent. Required in Piano; junior year; three terms; 6 credits each term; 2 private lessons; 3 to 4 hours daily practice.

Mus 431, 432, 433. **Piano.** Continuation of technical training. Beethoven sonatas of the later period; Liszt and Busoni arrangements of Bach; Bach in the original; Chopin studies; compositions of all periods best suited to the need and ability of the student; a

standard concerto, played with orchestra, required for graduation recital; or program including a Beethoven sonata and other compositions from the Master, as prescribed by the instructor.

Prerequisite: Mus 333. Required in Piano; senior year; three terms; 6 credits each term; 2 private lessons; 3 to 4 hours daily practice.

Practice Teaching

For students desiring it, practice teaching, for which no fee is charged, will be arranged as part of the training in each of the three terms of the senior year.

Electives

Mus 131a, 132a, 133a. **Piano.** Courses for students from other schools of the College and those majoring in other departments of the School of Music, curtailed to meet the individual needs of the students. The work includes thorough technical pianistic foundation and suitable compositions according to the advancement of the individual student.

Elective; any three terms; 2 credits each term; 1 or 2 private lessons; 1 to 2 hours daily practice.

Mus 231a, 232a, 233a. **Piano.** Continuation of Mus 133a. Advanced technical training and compositions selected to suit the talents and needs of the student.

Prerequisite: Mus 133a. Elective; sophomore year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

Mus 331a, 332a, 333a. **Piano.** Continuation of Mus 233a.

Prerequisite: Mus 233a. Elective; junior year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

Mus 431a, 432a, 433a. **Piano.** Continuation of Mus 333a.

Prerequisite: Mus 333a. Elective; senior year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

ORGAN

An excellent Kimball, three manual pipe-organ is available for practice purposes at reasonable rates.

Mus 134, 135, 136. **Organ.** A course for major students in the School of Music or those of other schools in the College. Exercises with particular emphasis on pedal technique and the development of independence of the hands and the feet on manuals; registration and tone color of various stops; easy pieces to suit individual needs; a reasonable piano technique required.

Elective; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

Mus 234, 235, 236. **Organ.** Continuation of Mus 136. Advanced technical training and pieces to suit the individual student.

Prerequisite: Mus 136 or satisfactory piano technique. Elective; sophomore year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

Mus 334, 335, 336. **Organ.** Continuation of Mus 236.

Prerequisite: Mus 236. Elective; junior year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

Mus 434, 435, 436. **Organ.** Continuation of Mus 336.

Prerequisite: Mus 336. Elective; senior year; three terms; 2 credits each term; 1 or 2 private lessons; 1 or 2 hours daily practice.

SINGING

COURSES

Mus 141, 142, 143. **Singing.** Fundamentals of correct breathing and control of the breath; tone emission and support of the tone; simple exercises, vocalises, and songs to suit the needs of the individual student.

Freshman year; three terms; 6 credits each term; 2 private lessons; 2 hours daily practice.

Mus 241, 242, 243. **Singing.** Further development of the breath and tone support; relaxation and coordination of the singing apparatus; more advanced exercises, vocalises, and songs; participation in the Glee or Madrigal club; singing in public at the discretion of the instructor.

Prerequisite: Mus 143. Sophomore year; three terms; 6 credits each term; 2 private lessons; 2 hours daily practice.

Mus 341, 342, 343. **Singing.** More advanced exercises and vocalises; arias from the standard oratorios and operas in English, French, Italian, and German; participation in recitals and concerts and ensemble singing under the direction of the instructor.

Prerequisite: Mus 243. Junior year; three terms; 6 credits each term; 2 private lessons; 2 hours daily practice.

Mus 441, 442, 443. **Singing.** Advanced exercises and vocalises; songs and arias selected from the modern composers; arranging of programs; selecting and arranging of teaching material. Before

receiving the diploma the student must give a recital from memory at the request of the instructor.

Prerequisite: Mus 343. Senior year; three terms; 6 credits each term; 2 private lessons; 2 hours daily practice.

Electives

Mus 141a, 142a, 143a. **Singing.** The same as the course outlined for those majoring in Singing adapted to the personal needs and talents of the student.

Elective; three terms; 1 or 2 credits each term according to the number of lessons taken per week; 1 or 2 private lessons; $\frac{1}{2}$ or 1 hour daily practice.

Mus 241a, 242a, 243a. **Singing.** Continuation of 143a. The work is arranged according to the talents and advancement of the individual student.

Prerequisite: Mus 141a or equivalent. Elective; sophomore year; 1 or 2 credits each term according to the number of lessons taken per week; 1 or 2 private lessons; $\frac{1}{2}$ or 1 hour daily practice.

Mus 341a, 342a, 343a. **Singing.** Continuation of Mus 243a.

Prerequisite: Mus 243a or equivalent. Elective; junior year; three terms; 1 or 2 credits each term according to the number of lessons taken per week; 1 or 2 private lessons; $\frac{1}{2}$ or 1 hour daily practice.

Mus 441a, 442a, 443a. **Singing.** Continuation of Mus 343a.

Prerequisite: Mus 343a or equivalent. Elective; senior year; three terms; 1 or 2 credits each term according to the number of lessons taken per week; 1 or 2 private lessons; $\frac{1}{2}$ or 1 hour daily practice.

VIOLIN

COURSES

Mus 151, 152, 153. **Violin.** Proper handling and care of the instrument and bow; selection of strings and placing on instrument; how to tune instrument; thorough and correct application of the important principles fundamental to correct use of bow and fingers; exercises and pieces selected in relation to the needs and temperament of individual students. Maia Bang Method, Books I, II. First position and half position.

Freshman year; three terms; 6 credits each term; 2 private lessons; 3 hours daily practice.

Mus 251, 252, 253. **Violin.** Maia Bang Method, Books III, IV. Schradeck finger exercises; Kayser and Maza etudes; work in sec-

ond, third, and fourth position; practical application in student concertos and standard classical pieces; participation in orchestra activities when assigned.

Prerequisite: Mus 153. Sophomore year; three terms; 6 credits each term; 2 private lessons; 3 hours daily practice.

Mus 351, 352, 353. **Violin.** Continuation of Maia Bang Method, Books IV, V; continuation of Maza's etudes; Fiorillo etudes; concertos and standard pieces embodying practical application of newly learned mechanical principles; participation in orchestra and ensemble playing at the discretion of instructor.

Prerequisites: Mus 253. Junior year; three terms; 6 credits each term; 2 private lessons; 3 hours daily practice.

Mus 451, 452, 453. **Violin.** Continuation of Maia Bang Method, Books V, VI. Kayser, Rode, and Dont etudes. Concertos suitable to advancement and musical intelligence; standard pieces; experience in sonata playing; ensemble and orchestra participation. Student is expected to give a public performance of a concerto with orchestra accompaniment and a recital program comprising a sonata and groups of smaller numbers.

Prerequisite: Mus 353. Senior year; three terms; 6 credits each term; 2 private lessons; 3 hours daily practice.

Electives

Mus 151a, 152a, 153a. **Violin.** Course modeled after the major course for Violin, modified to suit the needs of individual students.

Elective; any term; 2 credits each term; 1 to 2 lessons per week; 1 or 2 hours daily practice.

Mus 251a, 252a, 253a. **Violin.** Continuation of Mus 153a.

Sophomore year; three terms; 2 credits each term; 1 or 2 private lessons; 1 to 2 hours daily practice.

BAND INSTRUMENTS

COURSES

CORNET

Mus 101d, 102d, 103d. **Cornet.** Exercises on the proper vibrations of the lips, and proper use of the breath. Attack; simple exercises by Clarke, Goldman, and others. Elementary solos and duets.

Mus 201d, 202d, 203d. **Cornet.** Exercises in single tonguing, studies on the slur; scales; chords; intervals; solos and duets.

Mus 301d, 302d, 303d. **Cornet.** Scales and chords; exercises in double and triple tonguing; ornamentation; sight reading; studies by Arban, Clarke, Weldon, St. Jacome, and others.

Mus 401d, 402d, 403d. **Cornet.** Characteristic studies by Arban and Clarke; duets by St. Jacome; the art of phrasing; solos approved by the instructor. Non-pressure system emphasized.

TROMBONE

Mus 101e, 102e, 103e. **Trombone.** Exercises on the proper vibrations of the lips without the instrument; exercises in the use of the breath, attack; producing the tone; simple exercises in the use of the slide.

Mus 201e, 202e, 203e. **Trombone.** Short shifts and direct shifts; the use of the wind; tone development; scales and chords; simple melodies.

Mus 301e, 302e, 303e. **Trombone.** Exercises on the slur; the development of the legato on the trombone; tonguing; studies by Vaubaron, Arban, Dieppo, and others.

Mus 401e, 402e, 403e. **Trombone.** Studies in tonguing, sight reading, phrasing, breath control; advanced studies by Vaubaron, Manna, Rauda, Clodomir and others; solos approved by the instructor. Non-pressure system emphasized throughout.

CLARINET

Mus 101f, 102f, 103f. **Clarinet.** Instructions in the proper handling and care of the instrument, selection of reeds, placing the reed on the mouthpiece; method of producing the tone; exercises in sustained tones; the correct use of the tongue and the breath; exercises in mechanism; simple exercises in duet form.

Mus 201f, 202f, 203f. **Clarinet.** Exercises in scales and chords; tonguing; the development of the staccato; special exercises for the lips and tongue; elementary studies by Klose, Lazarus, De Ville, Staats, and others.

Mus 301f, 302f, 303f. **Clarinet.** Intervals; advanced studies in duet form; technical exercises; sight reading; characteristic studies by Klose, Toll, Langenus, Baermann, and others.

Mus 401f, 402f, 403f. **Clarinet.** Advanced technical studies; phrasing; transposition; solo playing.

OTHER INSTRUMENTS

Courses similar in scope to those outlined above are offered for all other band instruments, including Oboe (a), Bassoon (b), Band Conducting (c), Baritone (d), Saxophone (g), Flute (h), BBb Bass (k), Eb Bass (m), Drums (r), French Horn (s), Bells (t), Xylophone (x). The numbering of the courses corresponds to the numbers given above for Cornet, Trombone, and Clarinet, except the distinguishing letter as indicated.

Summer Session

- WILLIAM JASPER KERR, D.Sc., LL.D., President of the College.
M. ELLWOOD SMITH, Ph.D., Director of the Summer Session; Dean of the School of Basic Arts and Sciences.
JOHN ANDREW BEXELL, A.M., Dean of the School of Commerce.
EDWIN DEVORE RESSLER, A.M., Dean of the School of Vocational Education.
HELEN LEE DAVIS, A.B., B.S., Vice-Dean of the School of Home Economics.
KATE WETZEL JAMESON, Ph.D., Dean of Women.
ULYSSES GRANT DUBACH, Ph.D., Dean of Men.
EDWIN BERTRAN LEMON, B.S., Registrar.

*Professors**

- FREDERICK BERCHTOLD, A.M., Professor of English.
JESSE FRANKLIN BRUMBAUGH, LL.B., A.M., Professor of Psychology.
EDNA AGNES COCKS, A.M., Professor and Director of Physical Education for Women.
NEWEL HOWLAND COMISH, M.S., Professor of Economics and Sociology.
JOHN LEO FAIRBANKS, Professor of Art.
SIBYLLA HADWEN, Professor of Institutional Management; Director of Women's Dormitories.
JOHN B. HORNER, A.M., Litt.D., Professor of History; Director of Oregon Historical Research.
ALMA GRACE JOHNSON, B.S., Professor of Household Administration.
WILLIAM ALEXANDER KEARNS, B.S., Professor and Director of Physical Education for Men.
LUCY MAY LEWIS, A.B., B.L.S., Librarian.
CHARLES BUREN MITCHELL, A.M., Professor of Public Speaking.
PAUL PETRI, Professor and Director of the School of Music.
FRANCIS LAWRENCE SNOW, Professor of Industrial Journalism.
JESSAMINE CHAPMAN WILLIAMS, B.S., M.A., Professor of Household Science.

*Names are listed alphabetically by rank under two divisions: Professors and Instructors.

BESS CHAPPELL, B.S., M.A., State Supervisor of Home Economics;
Teacher Trainer.

DELMER MORRISON GOODE, A.B., Associate Editor of Publications.

SIGURD HARLAN PETERSON, A.B., Associate Professor of English.

ROY RENO HEWITT, Ph.B., LL.B., M.A., Assistant Professor of Political
Science.

VICTOR PIERPONT MORRIS, M.A., Assistant Professor of Economics and
Sociology.

AMBROSE REUBEN NICHOLS, B.S., Assistant Professor of Industrial
Education.

DORIS MABEL THORNELY, Assistant Professor of Physical Education
for Women.

Instructors and Assistants

RUBY EVANGELINE BEERS, B.S., Instructor in Household Administration.

JAMES FREDERICK BURSCH, M.A., Instructor in Education.

RALPH ORVAL COLEMAN, B.S., Instructor and Coach in Physical Edu-
cation for Men.

MARTIN LOUIS GRANNING, Instructor in Automobile Mechanics.

MARY STEWART LYLE, M.S., Critic Teacher of Home Economics Educa-
tion.

ROBERT HENRY HAGER, Instructor and Coach in Physical Education for
Men.

JAMES HAROLD IRVINE, M.B.A., Instructor in Accounting.

ARLEIGH KAMMERER, B.S., Assistant in Household Science.

LOUIS E. KUEHN, Assistant in Physical Education.

ROY MERLE LOCHENOUR, LL.B., J.D., Instructor in Political Science.

MARGARET MOREHOUSE, B.S., Instructor in Household Art.

GLADYS PETERSON, B.S., Instructor in Millinery.

ROBIN REED, Assistant in Physical Education.

FRANK LESLIE ROBINSON, Instructor in Accounting.

GERTRUDE STRICKLAND, Instructor in Household Art.

RUTH THAYER, B.S., A.B., Instructor in Physical Education for Wo-
men.

HARRY HOWARD TUCKER, A.B., Instructor in English.

- MARY STANDERWICK VAN KIRK, Instructor in Household Art.
 BERTHA ALICE WHILLOCK, B.S., Instructor in Secretarial Training.
 GLADYS LOUISE WHIPPLE, B.S., Instructor in Household Art.
 HAROLD WHITE, B.S., Instructor in Agricultural Education.

*VISITING INSTRUCTORS**

- CHARLES R. ALLEN, B.S.,
 Editor and Consultant for Federal Board for Vocational Education—
 Who will give a Survey of Vocational Education and lead in the conference
 on Methods for Trade and Industrial Teachers.
- PAUL F. GAISER, B.S., M.A.
 Principal of Corvallis High School—
 Who will offer courses in History, Civics, and Economics, for college en-
 trance credit.
- KARL HECKRICH,
 Director of Physical Education for the Minneapolis Athletic Club—
 Who will give courses in Dancing and Fundamental Free Exercises.
- CAROLINE HEDGER, M.D.,
 Medical Director for the Elizabeth McCormick Memorial Foundation—
 Who will give her course in Child Care.
- I. A. MELENDY, B.S., A.M.,
 Vice-Principal of Franklin High School, Portland—
 Who will offer courses in English for college entrance credit.
- MAUDE J. MILLER, B.S.,
 Supervisor of Home Economics for the St. Paul City Schools—
 Who will offer work in Meal Planning and Serving.
- KNUTE ROCKNE, B.S.,
 Director of Physical Education and Coach of Athletics, Notre Dame Uni-
 versity—
 Who will give his Football Coaching course.
- ALETHIA ELIZABETH SMITH, B.A.,
 Instructor in Speech at the University of Minnesota—
 Who will offer work in Dramatics.
- MARY SPALDING, M.A.,
 Of the Anti-Tuberculosis Association of New York—
 Who will give the course in Health Education.
- ARTHUR C. STRANGE,
 Superintendent of City Schools, Astoria, Oregon—
 Who will give work in the School of Vocational Education.
- HAROLD SAXE TUTTLE, B.S., B.D., M.A.,
 Head of Department of Education, Pacific University—
 Who will give a course in Character Education Methods and other work in
 Education.
- ELLA EHNSEN WILSON, A.M., Dean of Girls, Franklin High School,
 Portland—
 Who will give courses for advisers of girls in high schools.

*Listed alphabetically.

GENERAL INFORMATION

General facts concerning the Summer Session, such as scope, admission, expenses, credits, etc., are given below. Further information of any kind, as well as any assistance that can be rendered students to plan their work in advance, or to make arrangements for coming, will be gladly furnished by the Director's office.

SCOPE

The Summer Session offers courses to meet the needs of a wide range of students and teachers with much or little previous preparation. Teachers, extension workers, students desiring either collegiate or entrance credit, and those interested in learning the practical arts of the home, the field, or the office, will find a variety of courses taught by experts.

Teachers in the secondary schools will find special methods of teaching technical courses required in the school curriculum. Experts from outside the state as well as on the regular College staff will demonstrate the latest method of teaching Agriculture, Commerce, Home Economics, Industrial Arts, and Physical Education.

The provisions of the **Smith-Hughes Act** have created a special demand for teachers of Agriculture, Home Economics, and other vocational subjects in the high schools of Oregon and neighboring states. The Oregon Agricultural College has been designated by the State Board for Vocational Education to train teachers for this work. Although adequate training of such teachers involves full four-year courses leading to a degree, the Summer Session offers many opportunities for teachers to fit themselves more adequately to meet the requirements of the Federal law. Some teachers need additional technical training with reference to subject-matter; others need additional professional training in Education in order to qualify. In either case the Summer Session affords an opportunity to secure the necessary preparation.

Physical Education. Full provision is made in the Summer Session for a wide choice on the part of coaches and teachers, both men and women, wishing to take up Physical Education. It is possible for teachers without previous training in this field to acquire sufficient proficiency in the six weeks of the Summer Session to handle the most necessary courses in the schools during the year. Knute Rockne of Notre Dame, Karl H. Heckrich, physical director of the Minneapolis Athletic club, and the head coaches in all the major sports including two Olympic champions, will conduct a summer school for athletic coaches of the utmost interest to schoolmen and coaches of the Northwest.

Education. Courses in general and technical Education have been arranged for teachers who must take additional courses in Education to satisfy requirements for **certification**. Especial attention is called to the courses for Deans or Advisers of high school girls and other courses relating to the moral and civic aspects of education.

Extension Work. Special courses in Community Entertainment and Public Speaking, in Industrial Journalism, Story Telling, Playground Methods, Special Day programs, and other allied subjects offer special opportunities for those engaged or expecting to engage in Extension activities.

College Credit. Courses also will be offered for students who wish to make up college work which they have missed, or for those who wish to shorten the time of residence by carrying some of their required subjects during the vacation period. Students who have not been graduated from high school, but who wish to secure additional credits which will count toward **college entrance**, will find courses taught by experienced high school teachers which will meet this need.

Other Opportunities. Others, whether with or without high school or technical training of any kind, will find courses open to them in all the practical fields of **Homemaking** or **Business**, with elementary work for those who need it, and advanced work for those who are already proficient. The wide range of courses offering practical experience in Home Management House, laboratories, and shops; the instructional staff; and the equipment—these, and all the other facilities of the Oregon Agricultural College make the Summer Session an institution of opportunity.

ADMISSION

All students who believe that they can profit by the instruction offered will be admitted without examination or the presentation of credentials. It is presumed that all who apply for admission have a serious purpose and are of good moral character. College credit will be granted to those qualified by entrance credit to receive it (see Credit for Work, p. 398).

EXPENSES AND ACCOMMODATIONS

The amount of money required for six weeks attendance naturally varies with the individual. Some allowance must be made for incidental and personal expenses not included in the usual estimate.

The regular College registration fee of ten dollars, collectable at the time of registration, is the only tuition charge. **This fee is not refundable.** Laboratory and shop fees are listed under each course.

Margaret Snell Hall and Waldo Hall will be the halls of residence for women. A charge for the term of twelve dollars a person for a double room, or eighteen dollars for a single room, will be made to cover cost of heat, light, use of laundry, etc. The rooms are fully provided with bed, bedding, table, and chairs. Each student in the halls must provide her own towels. A well equipped laundry room will be open for the use of students without extra charge. The Y. M. C. A. assists men students to find desirable accommodations in private homes adjacent to the campus.

Regular meals will be served in Margaret Snell Hall at a charge of \$42.00 for the session; that is, at the rate of approximately \$7.00 a week. Students, both men and women, not residing in the hall may arrange for meals at the same rate. No deductions will be made for absence of less than one full week except that for the Newport trip arrangements may be made.

The dormitories for women will be open for lodging Sunday, June 21. Meal service will begin Sunday evening. Room charge for part of a week will be the same as for a full week.

Tenting privileges will be granted on application, for a nominal charge of \$1.00, to those providing their own tents. Water and toilet facilities are conveniently accessible. Fuel may be purchased at cost.

Since students registered for the Home Management House course (HAd 450) will live in the Home Management House throughout the Summer Session, they need make no other provisions for room and board.

Allowing \$54.00 for board and room, \$10.00 registration fee, \$1.00 for drayage on baggage, and \$10.00 for laundry and incidentals, the minimum cost for the entire six weeks may be estimated at \$75.00, exclusive of railroad fare. Those who take courses requiring text-books or laboratory fees must make some additional allowance.

REGISTRATION

Students are requested to file a preliminary registration by filling out the Informal Registration Blank and mailing it as early as possible in order that arrangements may be made more completely for handling the work in the different departments. This application is not binding either as to attendance or choice of studies. Final registration should be made at the Director's office in the Library Building as early as possible on Monday, June 22.

The Committee on Registration will be in session from 9:00 until 12:00 and from 2:00 until 5:00 in the main reading room, Library Building. Students should consult this Committee in making out courses and schedules. Because of the shortness of the session, students should arrive in time to complete registration on Monday in order to attend the first meeting of all their classes on Tuesday. Full credit cannot be given for students entering more than one week late. No course will be offered for less than seven students, but if difficulty is experienced in arranging work, the student should consult the Director.

WITHDRAWAL

The term is so short and the fees are so low that no refund of the regular registration fee can be made because of withdrawal. A refund on laboratory fees and deposits may be adjusted proportionately to time and materials consumed.

CREDIT FOR WORK

Students whose preparatory work qualifies them may receive college credit for the work taken to the extent indicated in the descriptions of the several courses. In general, the credit for Summer Session work is approximated to that of the regular college year on the basis of three credits for five recitations a week through the session. A maximum of nine credits exclusive of Physical Education may be earned during the Summer Session as against sixteen and one-half credits in one term of the regular year. Credit in excess of the approved maximum may be allowed only for unusual cause, on approval of the Scholarship Committee, and with the provision that the student's general average for all subjects taken during the session shall be at least 85 percent.

AUDITING

Regularly registered students in the Summer Session may audit without additional charge lectures in other courses, but such auditors may not participate in the discussions or submit work produced in connection with the courses for the examination of the instructor. Students will be granted the privilege of auditing by presenting to the Registrar a formal petition approved by the instructor who gives the course and the Director of the Summer Session, but no record will be preserved nor may the fact of auditing be made the basis for request for examination or the securing of credit in any way.

GRADUATE CREDIT

Graduate credit is to be by special arrangement with departments concerned and approval of the Committee on Graduate Study. Plans of work should be submitted in advance to the Director. Work to qualify for graduate credit must be of a superior character. In courses open to graduate and undergraduate students, the graduate students will be expected to do additional work beyond the minimum requirements under special guidance of instructor.

APPOINTMENT OFFICE

Students and teachers attending the Summer Session will be assisted to find teaching positions for the following year by the Appointment Office, Forestry Building 200.

SOCIAL AND OTHER FEATURES

A recreational, inspirational background is necessary for the best, most productive work in the summer time, and special attention will be given to the development of that spirit of friendliness and comradeship which should be a valuable part of the Summer School life. Besides week-end social affairs on the campus, hikes, a week-end at the Coast, and an excursion to Mary's Peak will be arranged. *Students would do well to bring sport clothes and hiking shoes.*

POPULAR LECTURES

A feature of the Summer Session is the program of addresses by speakers of national distinction. The program for the coming session is in preparation and will be announced later.

From July 8 to July 15 inclusive, the Ellison-White Chautauqua System will be offering a program in Corvallis which will be of interest to many of the students in the Summer Session.

SUMMER CLIMATE

Corvallis is pleasantly situated for summer study, the average summer temperature being 77 degrees F. A refreshing ocean breeze which sets in through a gap in the Coast Range to the west each afternoon insures a cool and tonic atmosphere. The city water system supplies absolutely pure mountain water.

ARRANGEMENT OF COURSES

The courses in this Bulletin are arranged in two major groups, the first consisting of the more strictly technical or vocational de-

partments, and the second comprising those subjects which constitute a part of any complete education and which are indispensable as foundation courses in technical education. To these are added miscellaneous or special courses. The schools or departments in the first, or Vocational group, are arranged in the Bulletin as follows: I. Vocational Education. II. Home Economics. III. Commerce. IV. Industrial Arts. V. Industrial Journalism. VI. Physical Education. VII. Scoutmastership. The second, or general group, consists of: VIII. Basic Arts and Sciences, under which head the different departments are arranged in alphabetical order. IX. Courses for Removal of High School (i. e., College Entrance) deficiencies. X. Short Course for Boys and Girls. XI. Summer School of Music.

CLASSES

Except in special cases, there are no classes scheduled to meet on Saturday.

I. VOCATIONAL EDUCATION

EDUCATION AND PSYCHOLOGY

1. **Elementary Psychology** (Psy 301). A preparatory course in the fundamentals of mental life from the functional standpoint; emphasis upon the application of psychical laws to the ordinary affairs of life.

Five periods; 3 credits.

J. F. Brumbaugh

2. **Educational Psychology** (Psy 322). Principles and laws of mental life and development as applied to the teaching process; psychological value of the various methods and paraphernalia of school life.

Five periods; 3 credits.

H. S. Tuttle

3. **The Child Mind** (Psy 433s). Consideration of the physical and mental development of the child in the various stages; aspects and interrelations, hygienic and moral sides receiving special attention.

Five periods; 3 credits.

J. F. Brumbaugh

4. **Educational Sociology**. See Economics and Sociology, p. 408.

5. **Secondary Education** (Ed 312). An analysis of the purposes, functions, methods, materials, and students of the high school. The relation of secondary education to the other divisions of public education is considered. The character of our social or-

ganization and social ideals is analyzed and its relations to a program of secondary education described. The value of each high school subject is considered in the light of social objectives.

Five periods; 3 credits.

H. S. Tuttle

6. **Measurement in Education** (Ed 333). A survey of standardized educational, mental, trade, and special ability tests of proved value in the public schools; history and theory of standard test construction; examination and analysis of sample tests; special attention given mental tests and tests of industrial and vocational subjects.

Five periods; 3 credits.

J. F. Bursch

7. **School Administration** (Ed 2s). Problems of Administration and Teaching; analysis of the jobs of superintendent and principal; discussion of school organizations, supervisors, use of measurements, school or community activities; correlation of the vocational branches with other subjects in the curriculum.

Five periods; 3 credits.

A. C. Strange

8. **Graduate Seminar** (Ed 3s). Advanced problems in modern educational practice. Students enrolling for this course must give evidence of being able to do a reasonable amount of independent investigation. Each member of the group will select for intensive treatment some problem from the fields of administration of secondary education, public school finance, educational measurements, school law, supervision, or curriculum construction.

To be arranged; 3 credits.

*Group of Courses concerned with the Moral and Civic Aspects
of Education*

ESPECIALLY FOR ADVISERS TO GIRLS:

9. **Problems of Advisers or Deans of Girls in High Schools** (Ed 3s). This course considers the problems which arise in the supervision of girls in high schools. Such topics as the following will be analyzed and discussed: the status, preparation and duties of deans or advisers of girls; the psychology of the adolescent girl in its bearing on behavior problems; the relation of the adviser to guidance in matters of health, religion, and personal matters.

Five periods; 3 credits.

(Mrs.) Ella E. Wilson

10. **The Organization and Administration of Extra-curricular Activities in High Schools** (Ed 4s). A course for those who are called upon to direct extra curricular activities in secondary schools, including an evaluation of the educational principles in-

volved with an effort toward their constructive application through school clubs, newspapers, magazines, etc.

Three periods; 2 credits.

(Mrs.) *Ella E. Wilson*

11. **Outlines of Social Hygiene Education** (Ed 5s). The fundamentals in sex education to be presented to high school girls, together with a critical examination and discussion of the best available books and pamphlets. The plans now in operation in a progressive school will be studied.

Two periods; 1 credit.

(Mrs.) *Ella E. Wilson*

GENERAL:

12. **Character Education Methods** (Ed 6s). This course involves an analysis of the problem of moral education; the nature of the goal; the psychology of motive, and the relation between judgment and behavior; with emphasis upon the problem of discipline. A program of projects or situations stimulating moral choice will be planned.

Five periods; 3 credits.

H. S. Tuttle

13. **Civic Education** (Ed 422). A study of the school as an instrument of society for transmitting its social inheritance; analysis of school organization, administration, school subjects, methods of instruction, extra-school activities, and methods of discipline, in the light of their contributions to training for citizenship.

Five periods; 3 credits.

J. F. Bursch

14. **Civics for Teachers.** See Political Science, p. 410.

15. **Health Education.** See Household Science, p. 407.

16. **Scoutmastership.** See p. 415.

Note: The following high school subjects may be of interest to teachers for subject-matter and methods: High School English (3d year), Grammar, Economics, Civics (two semesters), and U. S. History, taught for entrance credit by experienced high school teachers. Observation may be arranged. See p. 419.

VOCATIONAL EDUCATION

17. **Vocational Education Survey** (Ed 7s). A history of the Smith-Hughes law; the organization of the work throughout the United States; a resumé of the progress made and results achieved.

Five periods for the last two weeks; 1 credit.

C. R. Allen, Editor and Consultant of the Federal Board for Vocational Education.

18. **Methods for the Vocational Teacher** (Ed 8s). This course will include job analysis as applied to trade, industrial, and home

economics work, and lesson planning based on those analyses. The conference plan will be followed. Charles R. Allen of the Federal Board for Vocational Education, Washington, D. C., will act as conference leader.

Credit to be arranged. 9:00-12:00 daily. July 20-July 31.

C. R. Allen

19. **Teaching Agriculture in Elementary Schools (AEd 1s).** For those who are to teach agriculture in the elementary schools and conduct Boys' and Girls' Club work, or who may be responsible for the organization and conduct of such work. The course will include a consideration of the principles and practices of agriculture most appropriate to the rural elementary school and of the problems and methods involved in course making, organization, and the teaching processes, together with methods of relating school instruction to club work and other forms of practical farm work.

Ten periods; 3 credits.

H. H. White

20. **Secondary Education in Commerce (CEd 451).** Principles of education as applied to the teaching of shorthand, typewriting, business English, and bookkeeping in high schools, rapid review of subject-matter, with model lessons in each subject; lectures covering aims, materials, methods of presentation, organization of courses and arrangement of curriculum.

Five periods; 3 credits.

Bertha Whillock

21. **Special Methods in Manual Training (IEd 342).** A study of the methods of organization and planning of lessons for public school teaching. The working out of at least twenty-four type lessons to serve as a guide in teaching in the public schools.

Five periods; 3 credits.

A. R. Nichols

22. **Foreman Training (IEd 491s).** Supervision of production, management, handling of men, plant practice, etc. Direct aim is training of foremen and minor executives. Adaptation of method to the problems of teaching. Conference method is used.

Five periods; 3 credits.

A. R. Nichols

23. **Special Methods of Teaching Home Economics in the High School (HEd 1s).** A course designed for teachers with experience who wish to study present-day problems in methods of teaching. Special attention will be given to developments in Smith-Hughes teaching.

Five periods; 3 credits.

Bess Chappell

24. **Recent Developments in Home Economics (HEd 2s).** A review of progress and changes which have been made during

the past few years particularly as they affect the public schools. Each phase will be presented by a specialist. The course is designed especially for teachers who wish to bring themselves up to date in the whole field of home economics.

Five periods; 3 credits.

Bess Chappell and other heads of departments

II. HOME ECONOMICS

For Special Methods of Teaching Home Economics in the High School (HEd 1s), and Recent Developments in Home Economics (HEd 2s), see Vocational Education, pp. 403-404 above.

The work in Home Economics aims to meet a wide range of needs. Courses are offered for:

(1) Teachers seeking further professional development, whether in foods, clothing and textiles, scientific home management, child care, or allied subjects, in elementary, advanced, or graduate courses. Special provision is made for those engaging in Smith-Hughes work.

(2) Those who are not teachers, who have a knowledge of the fundamentals of Home Economics work, but who desire more extended or specialized training.

(3) Students in Home Economics curricula seeking to shorten their work for the degree or get subjects outside of the regular curricula.

(4) Other students, not aiming at a degree, who take such work as they are prepared for, for its practical value.

Equipment. The School of Home Economics of the Oregon Agricultural College is classed with the leading schools of its kind in the United States. Its spacious building is well equipped with laboratories, home kitchens, dining-rooms, living-rooms, etc. The laboratories are large and airy, and electric ranges secure the comfort of those taking foods work during the Summer Session. The school established one of the first home management houses in the country, and has worked out a course through a series of years that is meeting the needs of the students.

HOUSEHOLD ADMINISTRATION

1. **Child Care** (HAd 1s). This course will be centered on standards of health and the rational care of children at various ages, and will include some detailed instruction in nutrition of school children with practical work in chart making.

Ten periods a week for the first three weeks. 3 credits. Fee \$0.50. *Caroline Hedger, M.D.*

2. **Household Management** (HAD 440). Application of the principles of scientific management to the home; study of the management of household operations and finances; study of family and community relationships. For homemakers and teachers of Home Economics.

Prerequisite: Economics. Five periods; 3 credits. Fee \$0.50.
A. Grace Johnson, Ruby E. Beers

3. **Home Management House** (HAD 450). This course deals with the problems of the homemaker. Students reside in the house for six weeks and carry on the various duties involved in the management of a home. (Section limited to eight.)

Prerequisite: HS 203 or 213 or equivalent. Three hours daily house work; 4 credits. Fee \$6.00 a week for living expenses.
Ruby E. Beers

HOUSEHOLD ART

1. **Clothing Problems for Household Art Teachers** (HA 1s). This course will be built around the needs of the teachers registered. Clothing problems met by high school teachers will be discussed. Short cuts in clothing construction and new, improved methods will be taught. The importance of developing good taste and judgment in selecting materials, combinations, colors, designs, decorations, etc., as well as skill, initiative, and efficiency in construction will be emphasized. (Limited section.)

Five lectures; 10 hours laboratory work; 3 credits. Fee \$1.50.
Gertrude Strickland

2. **Practical Textiles** (HA 2s). Subject-matter related to textiles, clothing, and housefurnishings which should be included in high school work in training the judgment of young women, developing their taste, and creating standards for wise, intelligent, and economical purchasing. Methods of adapting textile study to high school girls in order to create a vital interest in the subject.

Five lectures; 2 credits. Fee \$1.50. *Margaret Morehouse*

3. **Short Course in Dressmaking** (HA 118s). Brief course for women who have knowledge of the technique of sewing, but who desire instruction in the art of dressmaking for practical use. Preparation and use of dress form; appropriate designs and principles of construction worked out in planning and making blouses, skirts, dresses, and children's clothes; principles of art applied to dress; textile discussions. (Limited section.)

Four lectures; 10 hours laboratory work; 3 credits. Fee \$1.50.
Gladys Whipple

4. **Costume Design** (HA 331). Study of proportions of figure, color, types, and personality; effects of line, proportion, color, and form in dress; problems in design and modeling based on art principles and historic study. (Limited section.)

Five lectures; 8 hours laboratory work; 3 credits. Fee \$1.50.

Mary VanKirk

5. **House Decoration** (HA 431). To teach students the principles underlying the planning and furnishing of moderate sized homes economically and wisely, at the same time applying the art principles of good design and color to choice and arrangement.

Five lectures; 3 two-hour laboratory periods; 3 credits. Fee \$1.50.

Margaret Morehouse

6. **Millinery** (HA 321). Designing and construction of frames; methods of covering; trimming; renovating. (Limited section.)

Five three-hour laboratory periods; 3 credits. Fee \$1.50.

Gladys Peterson

HOUSEHOLD SCIENCE

1. **Meal Planning and Serving** (HS 1s). Course deals with the principles involved in the selection of good food combinations, the principles and practices in marketing, the preparation of various types of meals from the standpoint of cost and suitability to different groups of people, and the table service appropriate for every type of meal. A modern suite of rooms, well-equipped with electric range, utensils, china, silver, and glass gives opportunity for all forms of table service. Students individually and in groups will plan, buy, prepare, and serve meals at various cost limits to the class group.

Four three-hour laboratory periods; 2 recitations; 3 credits. Fee \$6.00.

Maude J. Miller

2. **Food Selection and Preparation** (HS 2s). Planned to meet the needs of homemakers and teachers who wish to review food selection and preparation and service of food based on the fundamental principles of nutrition. This course is basic to the course in Meal Planning and Serving.

Four three-hour laboratory periods; two recitations; 3 credits. Fee \$5.00.

Mary S. Lyle

3. **Food Problems for Teachers of Household Science** (HS 3s). This course is designed to assist teachers of food courses in solving special class and laboratory problems; to present newer methods of dealing with subject-matter; to develop basic or pattern proportion for related recipes; to plan food and health projects possible to carry out with grade and high school students.

Opportunity for the individual teacher to work on her own problems under direction can be arranged, as a part of the course.

Two four-hour laboratory periods; two recitations; 8 hours outside work; 2 credits. Fee \$3.00.

Mary S. Lyle

4. **Nutrition (HS 4s).** The course deals with the newer developments in the subject, such as the vitamins, the new importance placed on minerals, the significance of recent scientific experiments and investigations, the literature dealing with dietary deficiency diseases, and the study of malnutrition in children. The course should be of value to high school teachers of foods and dietetics and to those who wish to become acquainted with the newer aspects of nutrition.

Five recitations; 1 three-hour laboratory period; 3 credits. Fee \$2.00.

(Mrs.) Jessamine C. Williams

5. **Health Education (HS 5s).** The increasing need for teachers who can teach health or conduct different phases of health work in all grades of school, especially in Home Economics classes, has created a demand for this course. Health work in all its aspects will be considered. Present methods of teaching health, its place in the curriculum, and its correlation with other subjects will have special attention.

Seven periods; 8 hours outside work; 3 credits. Fee \$0.50.

Mary Spalding

6. **Camp Cookery (For Women) (HS 6s).** Preparation of palatable and nutritious meals from food materials available in camp; outdoor food preparation using Dutch ovens, reflectors, and improved camping utensils.

Two three-hour laboratory periods; 1 credit. Fee \$3.00.

Arleigh Kammerer

III. COMMERCE

For Secondary Education in Commerce (CEd 451) see Vocational Education, p. 403.

Each of the four departments of the School of Commerce offers courses both for teachers and general students. As indicated below, several of the courses are designed primarily for elementary and high-school teachers.

The departments of Finance and Administration and Secretarial Training offer work emphasizing methods in teaching, as well as practical instruction in the respective subjects. The Government and Business Law courses will also appeal to both teachers and general students. The courses in Economics are offered with the expectation that they will appeal to any or all of the following classes:

(1) The citizen of Oregon. (2) The college student. (3) Farmers and those interested in farming. (4) Teachers in public schools. (5) Those desiring a course in Secretarial Training.

ECONOMICS AND SOCIOLOGY

1. **Principles of Economics** (ES 203). A general course covering our industrial and commercial organization, the nature of wealth, its production, consumption, and distribution; law of diminishing returns; division of labor and efficiency in production; exchange and distribution in their relation to the price-making process; factors determining prices, wages, interest, rent, and profits; problems of taxation; public expenditures; protection and free trade; money and banking; labor problems; and transportation.

Five periods; 4 credits.

V. P. Morris

2. **Conservation** (ES 211s). Economic wastes arising out of the exploitation of natural resources; the maladjustment of industry; the misdirection of labor; the present order of consumption; conservation laws and policies tending to eliminate wastes and abuses.

Five periods; 3 credits.

N. H. Comish

3. **Educational Sociology** (ES 307). A study of the field of Sociology from the educational point of view; social institutions in their origin and development; social activities in their relation to institutions and the individual; social control or the molding of social institutions and the directing of social activities; different methods of social investigation and their comparative results. May be substituted for Introduction to Sociology, ES 393.

Five periods; 3 credits.

V. P. Morris

4. **Markets and Marketing** (ES 402). A critical study of the marketing of staples, semi-staples, and perishable farm products, including the geographical location of producing areas, marketing routes from the producer to the consumer, types of middlemen, direct marketing, marketing costs, standardization, factors influencing prices, and a general description of our whole marketing system as it exists today.

Five periods; 4 credits.

N. H. Comish

A. High School Economics. See p. 419.

FINANCE AND ADMINISTRATION

1. **Principles of Accounting** (FA 101). A thorough but rapid study of the general principles of bookkeeping. The aim of this course is to afford those students entering the curricula in Com-

merce, who have not had a year of bookkeeping, an opportunity to secure preparation which will enable them to carry FA 102.

Five periods; 3 credits. Fee \$1.00.

F. L. Robinson

2. **Teachers' Course in Bookkeeping (FA 1s).** A course for high-school teachers of bookkeeping, based upon the State Course of Study and the bookkeeping text followed in Oregon. Methods of presenting the subject of bookkeeping most effectively to high-school students will receive emphasis. A thorough knowledge of bookkeeping based upon at least a year's study or teaching is a prerequisite for this course.

Five periods; 3 credits. Fee \$0.50.

F. L. Robinson

3. **Business Organization (FA 331).** A course in ownership business organization. General nature of business organization; origin, evolution, and forms of business units; structure and life-history of typical corporations; the corporation and trust problem; public utility corporations. Note: This course will be accepted as satisfying the requirement for FA 371, Business Management for Women, in Home Economics Professional Curriculum.

Five periods; 3 credits.

J. H. Irvine

4. **Corporation Finance (FA 431).** The promotion, organization, financing, and management of corporations; corporate securities and facilities for marketing them; reorganization and receivership; blue sky law and state control.

J. H. Irvine

POLITICAL SCIENCE

1. **Business and Rural Law (PS 163).** A short course in the laws of business, covering briefly much the same field as PS 201 and PS 202 of the regular year.

Five periods; 3 credits.

R. M. Lockenour

2. **National Government (PS 301).** Consideration of the organization, functions, and present-day problems of the American Federal Government. Methods are emphasized. Illustrative material and bibliography for teachers of Civics and History are discussed.

Five periods; 3 credits.

R. M. Lockenour

3. **State and Local Government (PS 302).** Consideration of the organization, functions, and present-day problems of state, county, and township government in the United States. The "Outline of the Government of Oregon" prepared by the faculties in Political Science in the various higher educational institutions of the state will be used in the course. Emphasis will be placed on teaching state government.

Five periods; 3 credits.

R. R. Hewitt

4. **Civics for Teachers (PS 1s).** A course especially designed for teachers, covering in general the entire field of Civics as required in the public high schools.

Five periods; three credits.

R. R. Hewitt

A. **Civics.** Consideration of national, state, county, and city government in the United States.

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit, no college credit.

P. F. Gaiser

SECRETARIAL TRAINING

1. **Stenography I (ST 101).** Theory of Manual, Gregg Shorthand, first eight lessons covered thoroughly. Shorthand penmanship given special attention.

Ten periods; 3 credits.

Jean Vance

2. **Stenography III (ST 103).** Theory of manual completed; thorough review of principles; attention to phrase writing; dictation.

Prerequisite: ST 102. Ten periods; 3 credits.

Jean Vance

3. **Typing I (ST 111).** Touch typing. Theory and practice of touch typing, covering mastery of alphabet and numerals; finger gymnastics; rhythm drills; dictation exercises.

Ten periods; 2 credits. Fee \$2.00.

Bertha Whillock

IV. INDUSTRIAL ARTS

For courses in Vocational and Industrial Education see Vocational Education, pp. 402-404.

1. **Automobile Mechanics, Elementary (IA 181s).** A systematic introduction to automobile mechanics by means of a detailed survey of the vital parts and their function. It includes practical work involving the assembling and disassembling of parts, testing for and locating troubles, making replacements and repairs. Lectures, demonstrations, and class discussions. A modern text is used.

Ten periods; 2 credits. Fee \$4.00.

M. L. Granning

2. **Automobile Mechanics (IA 182s).** Continuation of IA 181s. Course involves a study of carburetors, ignition, starting and lighting systems, the more complex adjustments and repairs, to the extent that time will permit. Lectures, demonstrations, and class discussions. A modern text is used.

Prerequisite: IA 181s, or equivalent experience. Ten periods; 2 credits. Fee \$4.00.

M. L. Granning

V. INDUSTRIAL JOURNALISM

1. **Elementary Industrial Journalism (IJ 200).** The course is intended to give the student practical experience in the fundamentals of news writing. It will be of value (1) for teachers who are called upon to supervise the publication of school periodicals or take charge of the preparation of copy for the school news column of local newspapers; (2) for county agents and home demonstration agents who desire journalistic training as part of their equipment. Students will assist in the preparation and editing of copy for the weekly Summer Session News. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully explained. Requirements of individual students are considered.

Five periods; 3 credits. Fee \$1.00.

F. L. Snow

2. **Journalism Practice I (IJ 204).** Laboratory practice for IJ 200. Opportunity is given to put the fundamental principles of journalism into practice.

Hours to be arranged; 2 credits. Fee \$1.00.

F. L. Snow

VI. PHYSICAL EDUCATION

The use of the big 100-by-50-foot tiled swimming pool, the use of both men's and women's gymnasiums, and the varied program of courses for both men and women allow of expert training under the most pleasant conditions.

Fees. Each student registering for work in Physical Education will be charged a general fee of \$1.50 to cover cost of soap, towels, showers, etc. An additional fee of \$0.50 will be charged for use of the big swimming pool at specified hours without lessons, or \$1.50 with lessons.

FOR MEN

The department of Physical Education and Athletics for Men supplies a constantly growing demand for men in coaching and physical education positions. The work given in the Summer School for Athletic Coaches will be of exceptional value to those who expect to qualify for either full time or part time coaching and physical education. In addition to the regular staff of coaches and instructors, including two Olympic champions, Knute Rockne of Notre Dame will give his course in football. Karl Heckrich, Physical Director of the Minneapolis Athletic Club, is another visiting instructor of unusual interest. The Summer School for Coaches will meet the demands of those who wish to brush up and get a new angle on all courses as well as of those in part time teaching and coaching situations.

1. **Football (Knute Rockne's Method).** The theoretical work will take up the rules from the standpoint of coach, players, and officials; the several styles of offense and defense with consideration of their special strengths and weaknesses; generalship and strategy. The practical work will include training, conditioning, and player's equipment; punting, the various kinds of kicking, tackling dummy and charging sled; special drills for linemen, ends, and backs; interference and team work; fundamental plays, freak plays, and signal systems. Lectures and practical work.

Five three-hour periods first two weeks, with continuance to be arranged; 2 credits. *Knute Rockne*

2. **Basket-ball.** Instruction will be given in basket-ball with the idea of fitting men to coach. The course will cover passing, goal throwing, dribbling, team play, how to condition a team, and the different styles of play used by the leading coaches.

Two two-hour periods; 2 credits. *R. H. Hager*

3. **Baseball.** Theory and practice in batting; base running; proper methods of fielding each position; team work and coaching methods; study of the rules; physical condition; methods of indoor practice.

Two two-hour periods; 2 credits. *R. O. Coleman*

4. **Track and Field Athletics.** Instruction and practical demonstration in starting, sprinting, distance running, hurdling, high and broad jumping, pole vaulting, shot putting, and discus; practical talks on methods of preparing contestants for different athletic events; adaptations to individual peculiarities; rules of competition; study of physical condition, including endurance, speed, fatigue, and all means of training for condition; work is assigned for the promotion, management and officiating of games and meets. Lectures and practical work.

Two two-hour periods; 1 credit. *R. H. Hager*

5. **Swimming.** Elementary and advanced courses in the various strokes will be taken up, together with simple and fancy diving; also a course in life-saving.

Five periods; 1 credit. Fee to be arranged.

L. E. Kuehn, R. O. Coleman

6. **Tennis.** Theory and practice together with a course in organizing tennis clubs, and management and organization of tournaments.

Two periods, beginning July 6; $\frac{1}{2}$ credit. *R. H. Hager*

7. **Fundamental Free Exercises and Exhibition Gymnastics.** The course represents Mr. Heckrich's development along lines

worked out by Nils Bok of Denmark and Roth of Indianapolis.

Five periods beginning July 6; 1 credit. *K. H. Heckrich*

8. **Wrestling** (PEm 8s). Fundamentals for class and individual work; personal proficiency.

Two periods; $\frac{1}{2}$ credit. *Robin Reed*

9. **Schoolroom Games and Gymnastics for Rural School Teachers.** This course outlines the work for schools in which all grades take their gymnastic work together.

Four periods; 2 credits. *K. H. Heckrich*

10. **Athletic Seminar** (PEm 9s). There will be an opportunity at 11:15 daily for an open forum on all topics being taught in Physical Education and Athletics. Questions may be presented at the beginning of each week for formal consideration or introduced less formally in the general round table discussion of various points.

FOR WOMEN

The work in Physical Education for Women is outlined for students and teachers wishing training for work in elementary schools, high schools, and playgrounds. These courses aim to help the teachers generally throughout the state as well as special teachers in Physical Education.

Staff. The courses are taught by the regular members of the department under the direction of Professor Edna A. Cocks.

Supervisors and Extension Workers will find such practical courses as 2 (PEw 131as), and 7 (PEw 273s), adapted to their needs in organization of recreation and community gatherings. Attention is also called to courses in Rural Entertainment, Story Telling, Public Speaking, Industrial Journalism, and other allied subjects to be found in their appropriate departments.

Teachers untrained in Physical Education wishing to take up this work in high schools or elementary schools will find the program of courses they should take at the conclusion of the list of courses below.

Outfit. Women will require for the regular gymnasium work and dancing classes and for basket-ball the regulation black gymnasium suit of middy and bloomers, black cotton hose and black gymnasium or black tennis shoes. For aesthetic dancing the ballet shoe is worn. Suits may be obtained through the gymnasium office. For field and athletic work a full, short, white skirt and middy, with tennis or sport shoes are worn.

1. **Gymnastics** (PEw 111s). A course in fundamental free exercises and exhibition gymnastics; floor and apparatus work with training in posture and breathing. Attention will also be given to the details of preparing for exhibitions, the choice and arrangement of suitable musical compositions, etc.

Five periods; 1 credit.

K. H. Heckrich

2. **Elementary Aesthetic and Folk Dancing** (PEw 131as). Aesthetic technique and practice of rhythmic movements; simple aesthetic dances and national folk dances.

Five periods; 1 credit.

K. H. Heckrich

3. **Advanced Aesthetic and Folk Dancing** (PEw 231as). Intermediate and advanced work for those who have had sufficient preparation to enable them to take up work of greater difficulty. This course will provide opportunity for those who had the course given in the last Summer Session to continue.

Five periods; 1 credit.

K. H. Heckrich

4. **Tennis** (PEw 141s). Rules of the game, strokes, tournaments.

Five periods; 1 credit.

Ruth Thayer

5. **Elementary Swimming** (PEw 151s). The teaching of the ordinary back stroke, side stroke, breast stroke, and simple diving.

Five periods; 1 credit.

Ruth Thayer, Doris Thornely

6. **Advanced Swimming** (PEw 252s). The teaching of more intricate strokes, fancy diving, fancy swimming, and life-saving.

Five periods; 1 credit.

Ruth Thayer

7. **Rural School and Special-day Programs and Pageantry** (PEw 273s). Development of the physical education program for the rural school, including programs suitable for special days. This course also includes the instruction in the production of simple pageants.

Five periods; 3 credits.

Doris Thornely

8. **Theory and Coaching of Athletic Sports for Women** (PEw 376s). Includes all organized sports and track athletics, with lectures and reference reading.

Five periods; 3 credits.

Ruth Thayer

9. **Public School Methods in Physical Education** (PEw 461s). This course is based on the State Course of Study for Physical Education and the Manual. Training is given in teaching physical work in the schoolroom, and in games for the schoolroom and playground. The course also includes methods in posture training.

Five periods; 3 credits.

Doris Thornely

10. **Schoolroom and Playground Gymnastic Games and Dances** (PEw 375s). This course will also include a consideration of the theory of play; a study of the nature of the child; the nature and function of play; the value of play; aims and spirit in the conduct of play.

Five periods; 3 credits.

K. H. Heckrich

Special Training Courses

Students untrained in physical education needing such training for work in high schools or elementary schools should take such of the following work as the Director of this department advises.

1. Gymnastics (PEw 111s).
- 2, 3. Aesthetic and Folk Dancing (PEw 131as and 231s).
4. Tennis (PEw 141as).
5. Elementary Swimming (PEw 151s).
6. Schoolroom and Playground Gymnastic Games and Dances (PEw 375s).
7. Rural School and Special Day Programs and Pageantry (PEw 273s).
8. Theory and Coaching of Athletic Sports (PEw 376s).
9. Public School Methods in Physical Education (PEw 461s).

VII. SCOUTMASTERSHIP

1. **Scoutmastership** (PEm 11s). Survey of the Boy Scout program, its history, aim and distinctive method; relation to the home, school, church; the basic Scout tests; hikes and camps; patrols and patrol meetings; troop organization and administration; training leaders. The theoretical aspects are carefully treated, but much time is devoted to demonstrations and practice. Various departments such as Physical Education, Political Science, Psychology, Public Speaking, Camp Cookery, etc., contribute lectures and demonstrations. The chief aim of the course is to fit a prospective Scoutmaster with the knowledge and technique which will help him most in giving efficient leadership to a troop of Boy Scouts. The local scout council cooperates in maintaining the course, and the National Council of the Boy Scouts of America issues the regular certificate to those who complete the work. A small fee will be collected in connection with the Camp Cookery work and hikes commensurate with the expense involved.

Five periods; 3 credits.

D. M. Goode and special lecturers

VIII. BASIC ARTS AND SCIENCES

ART

1. **House Planning** (Ar 331s). The problems of planning and decorating simple houses are considered with emphasis on service and beauty. Replanning an old house, specifications, etc., will receive attention.

Three two-hour periods; 2 credits. Fee \$0.50. *J. L. Fairbanks*

2. **Color Rendering** (A 351). Color theory; brush technique; flat washes over pencil; use of water-color washes in the expression of landscape gardening subjects. Fee \$0.50. *J. L. Fairbanks*

3. **Art Appreciation** (A 411s). The development of art in the practice of architecture, painting, and monumental art. Fee \$1.50.

Two periods; 1 credit. *J. L. Fairbanks*

4. **Methods of Art Teaching** (A 471s). Consideration of the problems of teaching art in elementary and secondary schools with particular attention to graded courses of study.

Three two-hour periods; 2 credits. *J. L. Fairbanks*

Note: Work in Drawing and Composition (A 110s) 2 credits, and Theory and Harmony of Color (A 130s) 2 credits may be arranged for if demand arises. Confer with the department.

CHEMISTRY

1, 2. **General Chemistry** (Ch 101, 102, and Ch 102, 103). (1) Fundamental principles and their application; the non-metallic elements and their compounds; laboratory work in the identification of anions. A two-week introductory course in elementary physical concepts precedes the regular work. (2) Metallic elements and their compounds; introductory study of chemical equilibrium; theory of solution; law of mass-action and the periodic law. The laboratory work completes anion classification and identification, and includes study of the reactions of the cations and their identification.

Five four-hour laboratory periods; 6 credits. Fee as below. Ch 101 and Ch 103 may be taken separately first or last three weeks respectively; Ch 102 may be taken either first or last three weeks.

3. **Organic Chemistry** (Ch 221s or 224s). Study of occurrence, methods of preparation, characteristic reactions, and properties of the more common organic compounds; the paraffins, alcohols, aldehydes, ketones, ethers, fatty acids, esters, benzene, phenols, aniline and a few dyes.

Prerequisite: Ch 103 or equivalent. Five four-hour periods; 5 credits. Fee as below. Three credits by special arrangement.

Laboratory Fees. For each course in Chemistry, a fee of \$1.50 a credit hour and a deposit of \$3.00 are charged, the latter returnable, less breakage.

ENGLISH

Composition

1. **Corrective English** (Eng K). Review of English grammar fundamentals. Required of students failing the classificatory examination for Eng 101.

Five periods; no college credit.

I. A. Melendy

2. **English Grammar for Teachers** (Eng 1s). A course covering briefly the nature and origin of language, spoken and written; basic laws and relations of grammar; the parts of speech with their forms and properties; good usage; methods, general and special. A minimum of time is given to the technicalities and extreme niceties; a maximum to the larger things.

Five periods; 3 credits.

I. A. Melendy

3. **Principles of English Composition** (Eng 101). Review of principles of rhetoric; practice in written and oral composition; frequent conferences between instructors and students as aids in meeting individual needs.

Five periods; 3 credits.

S. H. Peterson

4. **Technical Composition** (Eng 103). Outline and precis making; reports; a study of scientific exposition.

Five periods; 3 credits.

H. H. Tucker

5. **Business Correspondence** (Eng 105). The business letter in detail, special attention being given to letters of application and letters of inquiry and information. At least two long themes, one being a sales argument and the other an advertising narrative, are required. Recitations, note-book work, conferences.

Five periods; 3 credits.

S. H. Peterson

6. **Industrial Journalism** (IJ 200). See "Industrial Journalism," p. 411.

Literature

7. **Contemporary American Novel** (Eng 2s). A study of the work of the more important recent American novelists, including W. D. Howells, Edith Wharton, Theodore Dreiser, James Branch Cabell, Joseph Hergesheimer, and others. The course will include some study of the historical development of the American novel. Lectures, discussions, reports.

Five periods; 3 credits.

H. H. Tucker

8. **Contemporary English Literature** (Eng 323). English literature of the late nineteenth and twentieth centuries.

Five periods; 3 credits.

F. Berchtold

9. **Continental European Literature** (Eng 481s). Reading and analysis of recognized masterpieces of continental European literature in approved translations.

Five periods; 3 credits.

F. Berchtold

10. **Types of Literature** (Eng 3s). A study of one or more masterpieces of each type; epic, ode, drama, essay viewed less as specimens to be analyzed than as human documents to be enjoyed.

Five periods; 3 credits.

I. A. Melendy

A. **High School English** (first semester, third year). See p. 36.

B. **High School English** (second semester, third year). See p. 419.

PUBLIC SPEAKING AND DRAMATICS

1. **Principles of Story Telling** (PSp 467s). For students preparing for playground, kindergarten, nursery, and extension work. Purpose of story; psychological reasoning for selected stories for different periods of childhood; fairy tales; folk lore; fable; Bible stories; myths; legends; nature and animal stories; hero tales; realistic stories; allegories; symbolic stories; dramatic stories; individual practice with criticism and suggestion, under critic teacher.

Five periods; 3 credits.

Alethia E. Smith

2. **Practical Public Speaking I** (PSp 254). Practice in the construction and presentation of original speeches; study of gesture, bearing, and the elements of ease and force in presentation; voice training; criticism on organization of material and delivery.

Five periods; 3 credits. (Two sections.)

C. B. Mitchell

3. **Methods of Teaching Interpretation** (PSp 1s). The dramatic interpretation of an entire play cut for public reading. Selections of material, method of cutting, characterization, mood interpretation, setting, descriptive presentation, personation, etc.

Five periods; 3 credits.

Alethia E. Smith

4. **Community Entertainment** (PSp 2s). This course is designed to meet the needs of rural leaders. It deals with the forms of entertainment that are suitable for presentation in rural communities, and gives practice in utilizing the facilities of rural halls, schoolhouses, churches, and private lawns. (a) or (b) may be taken separately, but it is strongly recommended that they be taken together.

(a). Pantomimes, tableaux, plays, etc. Five periods; 3 credits.

Alethia E. Smith

(b). Make-up, pageantry, shadow pictures, costumes, etc. Five periods; 3 credits.

C. B. Mitchell

IX. COURSES OFFERED FOR REMOVAL OF HIGH SCHOOL DEFICIENCIES

A. **First semester of third year high school English.**

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit.

B. **Second semester of third year high school English.**

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit.

C. **English Grammar.** See Corrective English, p. 34.

D. **First Semester High School Civics.** A study of American Governmental institutions, national, state and local. The United States constitution will receive special attention.

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit. *P. F. Gaiser*

E. **Second Semester High School Civics.** A critical analysis of outstanding problems of American democracy. Emphasis will be placed upon issues with which every American citizen should be familiar.

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit. *P. F. Gaiser*

F. **High School American History.** A general survey of the outstanding facts in American History which have resulted in the United States of today. Outside reading and reference work will be assigned according to the needs of the individuals so that high school credit may be obtained for either the first or second semester work in high schools.

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit. *P. F. Gaiser*

G. **High School Economics.** A study of economic laws and principles in their relation to historical events and to every-day experience, especially in industrial activities.

Five periods; $\frac{1}{2}$ unit ($\frac{1}{2}$ year) entrance credit. *P. F. Gaiser*

X. SUMMER SCHOOL FOR MEMBERS OF BOYS' AND GIRLS' CLUBS

Direction of H. C. SEYMOUR, State Club Leader

A two-week course for boys and girls in practical Agriculture, Animal Husbandry, and Home Economics, correlated with Club work, will be given on the campus of the Oregon Agricultural College June 15 to 27. Four hundred were enrolled in 1924. The Club members at the State Fair who placed first in the various projects or divisions of the projects, are all members of this summer school, their expenses being paid by Portland business men and livestock breeders' associations, who donate the money for these trips. The Union Pacific Railway system is sending one repre-

sentative from each county affected by their road. In addition, many counties, organizations, and clubs have offered scholarships as prizes to their Club members and will send large delegations. Other Club members will be admitted upon the acceptance of their applications, up to the number that may be accommodated, expenses to be paid by the applicant.

The girls will be quartered in Waldo Hall and the boys in Cauthorn Hall. They will all be chaperoned by members of the faculty, who will be on duty both day and night. Supervisors will be in charge of the boys and girls in all forms of recreation and during all time outside of classrooms, to insure each individual boy or girl enjoying his or her share of all the good times provided.

Classroom and field instruction will occupy about four hours each day, except Saturday and Sunday. This instruction not only will be quite different in matter and method from the usual school instruction but will be varied so as to avoid monotony. Physical recreation for both boys and girls will be a prominent feature of the course. Indoor and outdoor sports of all kinds will be taught. These will include swimming in the pools under safe and expert instruction, and only under adequate supervision. Trips to neighboring points of interest will also be taken.

At each general assembly the speaker will be some prominent official or business man or woman of the state. The Club members have an opportunity at such gatherings to come into contact with people of importance.

Methods of Admission. The names of those winning trips at the state and county fairs have been filed with the Director of the Summer Session, and reservations made. All others who wish admittance should fill out the Application Blank and send it as soon as possible to the Director of the Summer Session or the State Club Leader. A few days before leaving home a card should be mailed, notifying the State Club Leader on what train you will arrive in Corvallis.

Those whose names have not been filed should note carefully the following directions:

(1) The applications must be approved by the county school superintendent, county club leader, or county agricultural agent.

(2) Applications should be filed on or before June 1. All applications will be acknowledged and acted upon at once.

(3) Applications may be sent after June 1, but no assurance can be given that they will be accepted.

Expenses. The fee for board and lodging is \$15.00. An additional allowance of a dollar or two should be made for note-books, pencils, etc. It is not well for young people to have too much spending money.

Each boy should be provided with complete change of underwear, shirts, and socks, for two weeks (he should have overalls or extra suit to work in); with bedding, including sheets, blankets or comforts, and pillows; with towels, soap, handkerchiefs, comb, brushes for hair, teeth, and clothes. Tennis shoes are required on the gymnasium floor; baseball gloves, bats, etc., tennis rackets, and bathing suits, will also find use. Lockers will be provided for safe keeping of each boy's clothing and equipment.

Each girl will need to bring a sufficient number of changes of underwear to last the entire two weeks, wash dress and apron to wear exclusively for cookery; a pair of bloomers (these may be galatea or of some kind of woolen material), and tennis shoes. Other items of personal effects, bedding, etc., are the same as for the boys, listed above.

XI. SUMMER SCHOOL OF MUSIC

PAUL PETRI, Director

FACULTY

PAUL PETRI.....Professor of Singing; Conducting

Mr. Petri has had many years of study and concert experience in New York, as well as seven years of intensive work in England and Europe, where he sang for three years in Grand Opera, 47 principal roles and 100 appearances in one season alone, as well as many concert engagements, fitting him preeminently to teach all branches of repertoire.

LILLIAN JEFFREYS PETRI.....Professor of Piano and Theory

Mrs. Petri has had many years of study and teaching experience in New York, and nine years abroad. Author of many published musical articles and of "Mind Over Muscle," a technical work that is unique in its field, published by Gamble Hinged Company, Chicago, she is recognized as a "teacher of teachers." For three years she served as President of the Oregon State Federation of Music Clubs.

MARGUERITE MACMANUS...Professor of Strings; Orchestra Conductor

Mrs. MacManus has had many years of the best instruction obtainable in this country, followed by four years under Thomson in Brussels and two years under Auer in Petrograd and New York. She has played all the great Violin Concertos with these masters, having also toured as soloist with Leopold Godowsky, Sousa, and others. She is director of the MacManus String Quartet.

HARRY LINDEN BEARD.....Professor of Band Instruments and
Band Conductor

Captain Beard has built up one of the finest Cadet Bands in the entire West, his work being too well known to need further mention.

HULDA HARTUNG.....Instructor in Public School Music, assistant
in Piano and Sight Singing

FLORENCE BOWDEN.....Instructor in Cello and Small Strings

BYRON ARNOLD.....Instructor in Pipe-organ; assistant in Piano;
musical history

JEANNETTE BOYER XANTEN.....Assistant in Voice Training

WILLIAM J. SKINNER.....Instructor in Wind Instruments

Arrangements for study in the School of Music may be made by students of other schools. Private lessons on the half-hour basis; terms, payable in advance, lessons missed by reason of severe illness being made up by special arrangement with instructors. College permits 6 credits in Music toward degree in any other school. Elective courses to suit individual need. Students register with the Director, Room 30, Administration Building.

Eighteen half-hour private lessons (3 weekly); 1 to 4 hours daily practice.

Tuition Fees. Private instruction, the term:

Mr. Petri	\$36.00
Mrs. Petri	36.00
Mrs. MacManus	36.00
Mr. Beard	22.50
Miss Hartung	22.50
Mr. Arnold	27.00
Miss Bowden	22.50
Mrs. Xanten	27.00
Mr. Skinner	27.00

For further information apply to Paul Petri, Director, Room 30, Administration Building.

Intensive Summer Courses

VOICE

Mr. Petri

Artists' Course.

Including: Operatic Arias with context and dramatic setting studied in either original language or English translation; Oratorio, Modern French, English (especially American), German and Italian literature; German Classics a specialty. Diction and enunciation; pronunciation of French, Italian, German; English diction a specialty. Lip and Tongue skill as related to throat relaxation. Vowels as vehicle for tone; consonants as forming the word, correlated.

Three half-hour private lessons with 4 one-hour lectures weekly. The term—\$80.

No young artist can afford to be without a working knowledge of all the important branches of the singer's art-repertoire. The student, however, may specialize in any branch best suited to his needs, and take all in English translation if preferred. The lectures will include thorough setting forth of the famous voice methods of the day; Caruso, Lilli Lehmann, Dr. Miller, and the OLD ITALIAN vs. the modern French and Italian methods will be explained and discussed.

Conducting of Glee and Madrigal Clubs Suitable for High School Work.

Includes: Technic of the Baton; Rhythm Drills; Practise conducting; Analysis of suitable material; care of the young voice, especially at the dangerous adolescent period.

Three hours weekly in class. The term—\$25.
Sight Singing. Miss Hartung. Highly specialized methods.
Three hours weekly in class. The term—\$10.

PIANO

Mrs. Petri

Fundamental Piano Pedagogy.

A normal course leading to Teacher's Certificate, designed to place young teachers in a position of authority on modern methods of scientific pedagogy. It includes: Rhythm drills; new methods for presenting notation; fundamentals of music from original angle; fundamentals of technic, based upon "Mind Over Muscle;" gymnastics for the hand development; correlation of technic with interpretation; analysis of teaching material; supervised practice teaching.

Twelve half-hour private lessons; 60 hours in class. The term—\$100.

Artists' Course.

Designed for young artists wishing to brush up on neglected repertoire. Correlates the various famous "methods" as directly applied to interpretation; harmonic analysis as scientific aid to memorizing.

Twelve hours private, 18 hours in class. The term—\$75.

Fundamentals of Music from New and Original Standpoint.

Correlating musical feeling with scientific numerical relations.

Four and one-half hours weekly, in class. The term—\$20.

Fundamentals of Technic.

Based upon the sound principles of "Mind Over Muscle," a work which scientifically correlates and regulates pianistic energies and movements with weight. European Finger Methods, Leschetizky arched hand and modern arm-weight methods correlated.

One hour private, and 3 hours in class weekly. The term—\$40.

Advanced Technic Directly Applied to Interpretation.

Three hours in class weekly. The term—\$25.

(Or) 1 hour private and 3 hours weekly in class. The term—\$40.

Analysis of Advanced Repertoire as Scientific Aid to Memorizing.

Three hours weekly in class. The term—\$25.

Accompanying, voice or violin repertoire.

1 hour private and 2 hours supervised work with voice and violin weekly. The term—\$60.

May be taken less intensively by those taking other courses.

VIOLIN

*Mrs. MacManus***Intensive Course in Fundamental Pedagogy in Violin and Viola.**

Designed for those wishing to teach beginners. Methods employed are those of the Modern Belgian and Russian Schools. Course includes physical training coupled with fundamental musical thoughts; supervised teaching of beginners; weekly seminar discussing teaching problems; literature for string instruments; teaching methods and material; study of violins, bows, and their makers; harmony course correlates and demonstrates logical way to present notation, scales, intervals, making these difficult points easy for the young student, who learns nothing by rote.

Two hours private and 8 hours in class weekly. The term—\$75.

Advanced Artists' Course, for Violinists and Violists.

Designed to meet the needs of teachers who have neglected their repertoire. Besides the lessons this course provides weekly participation in rehearsals of advanced orchestra and opportunity for those qualified to appear as soloists with orchestral accompaniment, or in chamber music recitals.

Three hours private, 1 hour ensemble lesson weekly with artist students in sonatas or chamber music works. The term—\$80.

Orchestra Organization, Discipline, Conducting, Principles of Orchestration.

Includes Technic of the Baton; practice conducting with orchestra, reading of score, explanation of range and function of all orchestra instruments; dynamics and phrasing as differentiated from effects by a single instrument; breath control and attacks for woodwinds and brass instruments; methods of drill, bowing and fingerings for string instruments; relations to private teachers and to community; Orchestra library practice. Designed for prospective High and Grade School Orchestra leaders and similar positions.

Three hours weekly in class. The term—\$25.

PUBLIC SCHOOL MUSIC*Miss Hartung*

Includes $\frac{1}{2}$ hour voice and 2 hours piano privately; fundamentals of music class, $4\frac{1}{2}$ hours; conducting, and technic of the baton, and practice conducting, 3 hours; sight singing and rhythm drills, 4 hours; public school methods, 1 hour; supervised practice teaching, 1 hour; weekly.

Two and one-half hours private and $13\frac{1}{2}$ hours in class weekly. The term—\$75.

OTHER DEPARTMENTS

MISS FLORENCE BOWDEN will be available for cello and small strings instruction. Her work is well known for its sterling, fundamental character.

MRS. JEANNETTE BOYER XANTEN is assistant to Mr. Petri, being schooled in his methods. She is known for the exquisite beauty and purity of her singing artistry, as well as for the lovely quality of her voice.

MR. BYRON ARNOLD will give instruction in pipe-organ; practice facilities offered.

MR. SKINNER will arrange for desired courses in wind instruments.

The Director reserves the right to make other special and equivalent arrangements in case the registrations for a given course are not sufficient in number to warrant holding it as herein stated.

It is the desire of the Director of the School of Music to offer as varied and thorough courses as possible to the serious musicians of the West who cannot afford the high prices charged in the great music centers, as well as to save them the cost of travel. The summer climate is ideal; living is reasonable; there are practice facilities.

Short Courses and Conferences

A number of intensive technical short courses and conferences will be offered at various times during the year. These will include a Poultry Conference, the annual Cannery School, a Herdsman's and Cow Tester's Course, a Short Course in Dairy Manufacturing, a Farm Mechanics Short Course, a Short Course in Land Classification and Appraisal, and possibly others as need develops.

For further information regarding any of these courses, address Dean of Agriculture, Oregon Agricultural College, Corvallis, Oregon.

Experiment Station

JAMES TERTIUS JARDINE, Director

The Oregon Agricultural College 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 Home Station at Corvallis and seven branch stations advantageously located throughout the state in such a way as to cover the varying agricultural conditions of the state.

THE HOME STATION

At the Home Station about 900 acres of land are used by the College and Station workers engaged in the scientific investigation of problems presented by the different branches of agriculture.

The Station organization includes the following departments: Agricultural Chemistry, Animal Husbandry, Bacteriology, Botany and Plant Pathology, Dairy Husbandry, Entomology, Farm Crops, Farm Management, Horticulture, Poultry Husbandry, Soils, Veterinary Medicine. In addition to the experimental work carried on by the departments of the Station proper, experimental work is conducted by the School of Engineering, the School of Home Economics, and the School of Pharmacy.

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 College to the people. 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.

As an illustration of the comprehensive character of the investigational work carried on by the Station, the following brief summaries of projects, by departments, are presented:

Agricultural Chemistry. Chemical research in agriculture at present is concerning itself with the following:

(1) Spray materials. The effect of suspensoids or spreaders on the chemical and physical properties of arsenicals is the latest phase of this work.

(2) Soil acidity. Soil types characteristic of the Willamette Valley are being studied from the standpoint of specific acidity, lime requirement (for legumes), and the nature of acids present.

(3) Sulfur in the role of a fertilizer. The sulfur content of Willamette Valley soil types and that of the rainfall over the Corvallis Station are being determined. Sulfur is probably the most important commercial fertilizer used in Southern Oregon at the present time. The tendency is to extend its use to other parts of the state.

(4) Legumes on acid soils. Just now research in this direction has for its object the determination of the influence of reaction of the soil solution upon the composition of vetch and other legumes.

(5) Yellowberry in winter wheat,—its cause and control on the wheat farms of the Middle Columbia River Basin.

(6) Soil survey. This is cooperative work with the department of Soils. Analytical work on predominating soil types determines for them their content of the several elements of plant food. It enables comparison of soil types from the standpoint of native fertility and suggests needful fertilizer practice.

(7) Animal nutrition. This is in part cooperative work with the department of Dairy Husbandry and Veterinary Science. The function of the mineral elements in growth and reproduction and the mineral requirements of the dairy cow and possibilities of meeting them with rations compounded from home-grown roughages, are questions of chief concern at present.

(8) Regulatory work. Enforcement of the State Fertilizer, Lime and Economic Poison laws involves collection and analyses of fertilizers, lime, insecticide, and fungicide samples. The object is to insure compliance on the part of manufacturers and dealers with the very reasonable requirements of the respective laws.

Animal Husbandry. Experiments in Animal Husbandry, which comprehend tests with horses, beef cattle, sheep, and swine, are conducted partly at the Corvallis Station and partly at the Eastern Oregon branch station. Experiments with horses are directed to determine the cost of horse-power for various types of farm and other work, the amount of work that may reasonably be expected from a horse, the cost of keep, etc. Experiments with beef cattle, conducted chiefly at Union, are concerned with fattening steers on various rations and with methods of maturing range cattle. Experiments with sheep have been directed to determine the cost of production, the carrying capacity of different types of pasture, methods of fattening sheep, maturing ewes, and methods of rearing

and marketing lambs for meat purposes. Experiments with hogs involve the cost of production, including rapidity of gain; and comparison of different feeding rations and methods of feeding, including the use of pasture.

Bacteriology. Experimental work in Bacteriology at present is confined to one major problem and three minor problems. The major problem is a microbiological study of certain acid soils in Oregon. The reason some acid soils show crop response when lime is applied while others do not may be found by careful study of the biological activities involved in the elaboration of the plant food. Preliminary results in the greenhouse where controlled conditions are maintained show that liming of the soil brings about a biological response in correlation with increased crop-producing power. This study is now being extended to field conditions to determine to what extent this correlation is altered by climatic and physical factors. Three minor problems are being investigated.

(1) Studies on the sulfur-oxidizing power of different soils and the power of these soils to neutralize the acidity formed through this oxidation. Preliminary results show that Oregon soils are not lacking in sulfur-oxidizing bacteria and that the cheapest source of ground sulfur is practically as effective as the more expensive grades of inoculated sulfur.

(2) Cross-inoculation studies with legume bacteria. Laboratory and field observations indicate that many serious discrepancies are found in the usually accepted groupings. For example, the horse bean (*Vicia faba*) does not cross-inoculate with spring vetch (*Vicia sativa*), though it is generally placed in the same group for cross-inoculation.

(3) Bacteriological studies of hemorrhagic septicemia in cattle, sheep, and swine are being carried on in cooperation with the department of Veterinary Medicine. So little is known about this disease that the diagnosis is often in doubt and the causative organism questioned. Vaccines properly prepared from the supposed causative organisms are very effective as a prophylactic or curative agent, but results from controlled experiments are neither consistent nor outstanding. Bacteriological studies, field observation, and vaccination studies are being carried on to determine the channel of infection, reservoir of infection, and manner in which disease is disseminated.

Botany and Plant Pathology. The work in this department includes the following investigations: methods of seed treatment and their effect on the vitality of the seed; virus diseases of potatoes; onion smut control; relative efficiency of various fungicides

both liquid and dust; Oregon crop-disease survey; miscellaneous orchard diseases; virus diseases of bramble fruits; miscellaneous fungi attacking small fruits; forage crop troubles; etc.

Dairy Husbandry. Investigations in this department are now concerned primarily with problems of production, although a few of the studies in manufacturing are being continued. Comparative study of the problem of different forage crops for silage for dairy cows is in progress; winter rations for growing dairy heifers are being studied to determine the most economical feeds for this purpose. In cooperation with the department of Agricultural Chemistry the mineral content of native feeds is being investigated, together with comparative values of Eastern Oregon and Western Oregon alfalfa hay. The department administers the Official Testing work in Oregon and acts as the Dairy Bull Registration Board.

Entomology. Experiments in Entomology include: (1) tests to determine the toxicity of various insecticides, to discover new and cheaper insecticides, to discover possible combinations of sprays that will reduce the number of necessary applications, to determine the actual amount of poison necessary to kill a given insect; (2) artificial propagation of beneficial insects; (3) control of root borers and other root-infesting insects; and (4) ecological, life-history, and control studies on orchard plant lice, leaf-rollers, fruit worms, codling-moth, and onion maggot; (5) forest insects; (6) biological studies and control of earwigs.

Farm Crops. The experimental work in Farm Crops consists of: (1) Forage work with vetches and related plants, red, burr, and sweet clovers; soy-beans; horse-beans; alfalfa; grasses for seed and for hay; pasture mixtures; the study of hay in the stack and in the mow; and some experiments on the making of silage. (2) Cereal experiments in varietal testing; breeding and nursery work with wheat and oats; varietal testing with barley, corn, and flax. (3) Potato experiments, including varietal trials; time and method of planting; methods of cutting; and hill selection and fertilizer work. (4) Weed control and eradication. (5) Crop rotations. (6) Miscellaneous experiments with hard seed and milling quality of wheat. (7) Tillage experiments to work out problems of seed-bed preparation, seeding, and handling of various crops.

It is proposed, when sufficient funds and land are available, to establish an extensive plant-breeding experiment in field crops, a rotation experiment based on crop yield and economy of production.

Farm Management. By means of the farm survey and through farm-record keeping and study of individual cases, a number of

the important phases of farm management are being investigated. These are as follows: (1) The determination of the chief factors in successful farming in six different counties of the state, through farm surveys and records. (2) Determination of the cost of production of different crop and livestock products and the cost of various farm operations, in sixteen counties, through record keeping. (3) Methods, efficiency, and costs in manure handling and preservation, through a survey. (4) Farm organization and management planning on individual farms. (5) Methods and costs of land clearing under different conditions.

Some special study is being given to labor supply and labor efficiency on the farm at this time.

Horticulture. Experiments in Horticulture comprise the following types of investigations: (1) More complex phases of pruning including (a) relation of the nitrogen-carbohydrate ratio to pruning practices, and (b) relation of carbohydrates and nitrogen to the behavior of apple spurs. (2) Varietal pruning, the working out of the best pruning practices adapted to the growth of different varieties of fruits. (3) Propagation of the filbert. (4) Pollination of the filbert and the cherry. (5) Breeding investigations with the filbert. (6) Strawberry variety tests. (7) Fertilizer investigations. (8) Breeding investigations with walnuts, apples, prunes, and strawberries. (9) Vegetable Gardening investigations in (a) field irrigation, (b) seed strain trials, (c) miscellaneous greenhouse crops. (10) Investigations with the by-products of fruits and vegetables. (11) Harvesting and storage investigations with pears, apples, cherries, and prunes.

Poultry Husbandry. Experiments in Poultry Husbandry are chiefly concerned with problems of breeding fowls for high average egg production, annually and for a period of years, and for a combination of egg production and meat value. Results in this field of experimentation have already been remarkable and promise still greater progress toward the objects desired.

Soils. The work in this department includes the following twelve specific investigational projects: fertility rotations; fertilizer experiments; soil-acidity tests and lime trials; cooperative soil survey; soil correction trials; cooperative tillage and soil moisture studies; surveys and feasibility of irrigation and drainage projects; cooperative duty of water and related investigations; experiments in the distribution of water and improvement of irrigation practice; drainage and improvement of wet soils; evaporation and weather studies in relation to soil production; improvement of water laws; critical soil-moisture points for different crops; phosphorus in "red

hill" soils; maintenance of organic matter in the soil; functions of sulfur in relation to soil; the use and value of manure. A comprehensive system of crop rotations and fertilizer trials is being conducted on some fifteen of the chief soils of the state to help develop a permanent system of agriculture. The duty of water and related investigations are statewide in scope. The aim is to determine the right amount of water for the chief soil types and leading crops under the main types of farming in the principal irrigated valleys of the state. The surveys to determine the feasibility of proposed drainage or irrigation projects are made as demand arises. The experiments in drainage are to determine the most efficient depths and distance apart for placing drains in soils of different types, and for testing the efficiency of bedding drains in straw as compared with soils. Since there are one-half million acres of marsh lands in the state and three million acres of land periodically wet, the value of these investigations is obvious. If efficient drainage should add to the value of the land the average determined for this work in the Middle West, the reclamation of the state's wet soils would add at least \$10.00 an acre to the value of these millions of acres.

Veterinary Medicine. The experimental work of this department is for the present devoted primarily to investigation of diseases of cattle, most attention being given to infectious abortion and sterility in breeding cattle. Some attention is given to anthrax and hemorrhagic septicemia in cattle, to hog cholera, "shipping fever" and forage poisoning in horses, and botulism (limberneck) in fowls.

THE BRANCH STATIONS

The seven branch stations at Astoria, Burns, Hermiston, Hood River, Moro, Talent, and Union, conduct experiments on the major agricultural problems of their respective agricultural sections of the state.

The John Jacob Astor Branch Experiment Station. At Astoria the major problems are dairying, improvement of farm crops, soil fertility, and soil management for Coast conditions and the drainage, improvement, and cultivation of tide lands.

The Harney Valley Branch Experiment Station. The station at Burns is conducting experiments in both dry-farming and irrigation agriculture as to: (1) varietal tests of grain and forage crops for this section of the state; (2) rates and dates of seeding; (3) tillage methods; (4) amount of irrigation water and methods of distribution for different crops; (5) fertilizers.

The Umatilla Branch Experiment Station. The station at Hermiston is studying problems of agriculture under irrigation on the Umatilla Reclamation Project and similar lands of the Columbia River Basin. Major attention is given to: (1) the amount of water needed for irrigation of different crops and methods of irrigating; (2) varietal trials of farm crops; (3) crop rotation experiments; and (4) fertilizer experiments.

The Hood River Branch Experiment Station deals with orchard pests and horticultural problems of this important orcharding section. Experiments and demonstrations are conducted to decide upon the most satisfactory sprays and the most efficient equipment and methods of applying them to control the various orchard pests of the region. In horticulture, investigations are directed primarily to methods of pruning for different fruit crops, fertilizers for orchards, varietal tests with small fruits and potatoes, and an orchard survey of methods and costs of production.

The Sherman County Dry-Farm Branch Experiment Station. The Moro station is conducting investigations on the major problems of dry-land farming in the Columbia Basin, including: (1) varietal tests and rate and date of sowing experiments with field crops; (2) cereal breeding investigations; (3) tillage experiments; (4) soil moisture and nitrate investigations; (5) crop rotation experiments; and (6) cereal disease investigations.

The Southern Oregon Branch Experiment Station at Talent is centering attention almost wholly upon problems involved in fruit production in this important fruit-growing region. The studies under way include: (1) investigations to determine relative resistance to pear blight of all the known species of *Pyrus* and all available varieties of cultivated pears in the hope of finding suitable blight-resistant pear stocks; (2) a test orchard of pear stocks, including the principal pear stocks of France, Japan, and China to determine those most satisfactory for Southern Oregon conditions; (3) testing new varieties of pears; (4) pear breeding experiments; (5) disinfectants for blight-control work; and (6) fertilizers for orchards.

The Eastern Oregon Branch Experiment Station. The Union Station is equipped with land and buildings for experiments with both livestock and farm crops. Major attention is at present devoted to the problems of growing and feeding cattle, sheep, and hogs with comparative study of different feeds and methods of feeding; the problems of suitable pastures, feeding, housing, and management of the dairy herd; investigations with grain and forage crops, including varietal trials of wheat, oats, barley, and legumes, crop rotations, making silage; and soil fertility studies.

Extension Service

PAUL VESTAL MARIS, Director

The Extension Service is one of the three great divisions of the Oregon Agricultural College, the functions of which include: resident instruction, experiment and research, and college extension.

The Extension Service is charged with the duty of extending the benefits, advantages, and available information of the College and of the United States Department of Agriculture to every portion of the state and to all those persons who for any reason are unable to come to the College.

The Extension Service includes all forms of off-campus instruction and assistance in those subjects in the College curriculum which lend themselves to extension methods or which can be taken and adapted to the direct needs of the people of the state. The various Extension activities are the means through which information, instruction, assistance, and methods of self-help are carried to all persons who desire them at any point within the state. In brief, the Extension Service represents the medium, both independently and in hearty cooperation with all other organized forces of betterment, for enlarging and enriching the agricultural and home interests of Oregon. No county, town, hamlet, farm, or home need be without some evidence of this service.

In a field so large, with such a multiplicity of problems and conditions, and with numerous methods of action care must be exercised to avoid wastefulness. As a protection in this respect the law requires the preparation of written plans for work and proposed expenditure of funds. These plans must be approved by the United States Secretary of Agriculture and by the President of the Oregon Agricultural College. These detailed plans of work are called projects. They must be approved before they are inaugurated, must be reported on at the close of each fiscal year, and when once adopted and signed cannot be altered or deviated from without the written consent of the authorities of the United States Department of Agriculture.

The several distinct lines of work now covered by written projects, from which the citizens of some portion of the state are receiving benefit, include:

(1) General Administration and Organization of the Extension Service.

- (2) Printing and Distribution of Publications.
- (3) Extension Meetings, Information, and Exhibits.
- (4) County Agricultural Agent Work.
- (5) Home Economics and Home Demonstration Work.
- (6) Boys' and Girls' Club Work.
- (7) Soils.
- (8) Horticulture.
- (9) Animal Husbandry.
- (10) Dairying.
- (11) Poultry Husbandry.
- (12) Farm Crops.
- (13) Farm Management Demonstrations.
- (14) Marketing and Organization.
- (15) Agricultural Engineering.
- (16) Rodent Control.

It should not be assumed that these projects cover the only 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 or home welfare, or to material agricultural development.

O. A. C. Alumni Association

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Alumni Office, 105 Commerce Hall, Corvallis, Oregon

The Alumni Association of the Oregon Agricultural College includes 4700 graduates and 10,000 ex-students. It is organized for the purpose of upbuilding the general welfare of the members; to give to the community what the College has given to them, and by united effort to promote all the interests of the Oregon Agricultural College, the state, and the Nation. Alumni of O. A. C. are found in every state in the union and in many foreign countries. Annual business meetings of the Association are held at commencement time each spring. A magazine is issued monthly ten times a year. Dues to the Association are \$2.50 a year or \$5.00 a year if paid on the \$50.00 life-membership plan. Campus headquarters of the Association are in Commerce Hall.

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- Polk County Club—President, Paul Robinson, '23, Independence.
 Portland Club—President, William E. North, '24, 1013 Porter Bldg., Portland.
 Secretary, Hazel Cole, '23, 980 Stevens street, Portland, Oregon.
 Salem Club—President, Mrs. Mark McCallister (nee Ada Finley, '03), 1433 South
 Liberty street. Secretary, Mrs. R. D. Slater (nee Bernice Bright, '23), 241
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 Silverton Club—President, Frank Riches, ex-'24. Secretary, Mary Cusack, '23.
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- Garden of the Sun Club—President, Fay Gillette, '21, Chamber of Commerce
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Walla Walla Valley Club—President, David Marr, '22, Walla Walla. Secretary, Helen John, '20, Walla Walla.

STATISTICS OF ENROLLMENT

REGISTRATION BY CURRICULUM AND CLASS, 1923-24

	Voc.	Fresh.	Soph.	Jr.	Sr.	Gr.	Special	Total
Agriculture	14	92	95	110	89	15	37	452
Commerce	4	422	229	135	72	2	53	917
Engineering:								
Civil		53	34	29	20		10	146
Electrical		142	72	52	41		8	315
Industrial Arts		15	22	14	10		6	67
Mechanical		48	39	36	28		10	161
Forestry		36	32	21	11		12	112
Home Economics		169	120	102	74	2	19	486
Mines		17	7	9	12		2	47
Chemical Engineering		30	19	21	7	1		78
Pharmacy		58	40	33	10	1	15	157
Vocational Education		62	60	48	30	10	10	220
Mil. Sci. and Tac.		2	1	1				4
Music		7	5	2	2		1	17
Optional		9	5	1		3	2	20
	18	1162	780	614	406	34	185	3199
Summer Session								
Regular							455	
Boys' and Girls' Clubs							307	
Special Music							11	
Swimming Only							127	900
Short Courses								157
Non-collegiate Music								53
Auditors								31
Grand total								4340

MEN AND WOMEN STUDENTS, 1923-24

	Men	Women	Total
Regular Session	2123	1076	3199
Summer Session	385	515	900
Short Courses	110	131	241
Total	2618	1722	4340

COMPARATIVE ENROLLMENT

1888-89.....97	1897-98.....336	1906-07.....833	1915-16.....3265
1889-90.....151	1898-99.....338	1907-08.....1156	1916-17.....3798
1890-91.....201	1899-00.....405	1908-09.....1352	1917-18.....3453
1891-92.....208	1900-01.....436	1909-10.....1591	1918-19.....4086
1892-93.....282	1901-02.....488	1910-11.....1778	1919-20.....4865
1893-94.....240	1902-03.....541	1911-12.....2868	1920-21.....5170
1894-95.....261	1903-04.....530	1912-13.....2314	1921-22.....5511
1895-96.....397	1904-05.....680	1913-14.....2435	1922-23.....4749
1896-97.....316	1905-06.....735	1914-15.....4176	1923-24.....4340

DEGREES CONFERRED, JUNE 9, 1924

	Men	Women	Total
Masters of Science	5	1	6
Bachelors of Science	261	127	388
Other degrees and diplomas	18	10	28
Total degrees conferred	284	138	422
Candidates receiving two degrees	6		6
Actual number in graduating class	278	138	416

INDEX OF NAMES

- Abele, L. T., 23
 Albert, A. L., 23
 Allen, Ethel, 28
 Allen, L. J., 31
 Anderson, E. E., 22
 Anderson, I. M. C., 32
 Anderson, W. B., 10
 Appelman, Ruth M., 29
 Arnesen, E. T., 24
 Arnold, B., 24
 Atwood, W. M., 13
 Avery, H. G., 32

 Bach, L., 10
 Baldwin, L. B., 16
 Ball, L. C., 18
 Ballance, Bernice, 25
 Ballard, F. L., 31
 Baltzel, Marjorie, 21
 Barnes, Elizabeth M., 18
 Barss, H. P., 10, 29
 Batcheller, J. H., 14
 Bayles, B. B., 31
 Beard, H. L., 13, 16
 Beaty, E. B., 14
 Bechlem, A. W., 22
 Beck, J. R., 32
 Beers, Ruby E., 25
 Bell, J. C., 23
 Bennion, F., 32
 Berchtold, F., 9
 Berry, J. A., 22
 Besse, R. S., 31
 Bessessen, B. B., 22
 Bexell, J. A., 9
 Blair, J. S., 25
 Blazier, Florence, 13
 Blackwell, Eva, 27
 Bloomquist, G. F., 16
 Boals, R. B., 17
 Boone, A., 25
 Bosworth, E. E., 23
 Bouquet, A. G., 11, 29
 Bowden, Florence, 23
 Brandon, H. C., 10
 Brandt, P. M., 10, 29
 Breithaupt, L. R., 32
 Bressman, E. N., 15, 30
 Brewer, Jennie M., 28
 Brewster, Ada, 32
 Briggs, C. R., 32
 Brigham, L. E., 17
 Brightman, Ruth H., 29
 Brooks, A. A., 27
 Brown, G. G., 30
 Brown, W. S., 11, 29
 Brumbaugh, J. F., 11
 Buchanan, Alice, 28
 Brucher, Olga, 29
 Bullis, D. E., 20, 30
 Burns, Amelia E., 22
 Burns, Lillian, 20
 Bursch, J. F., 18
 Burner, J. C., 25
 Butler, M. H., 17

 Cady, O. H., 18
 Callahan, Ida B., 14
 Carbaugh, Freda, 25
 Card, L. W., 14
 Carleton, P. D., 25
 Carpenter, P., 32
 Carpenter, W. S., 32
 Case, Lucy A., 31
 Cate, C. C., 32
 Chamberlin, W. J., 17
 Chappell, Bess, 19
 Chappell, V. D., 14
 Childs, L., 30
 Christiansen, J. G., 18
 Cockerline, H., 18
 Cocks, Edna A., 11
 Coleman, R. O., 15
 Collier, Arnold, 32
 Colman, H. N., 19
 Comegys, Eva, 32
 Comish, N. H., 11
 Cook, Margaret F., 31
 Cooley, Esther B., 31
 Cooney, B. W., 32
 Coonradt, A. C., 23
 Copson, G. V., 11, 29
 Cordley, A. B., 9
 Cosby, H., 31
 Courtney, W. D., 23
 Covell, G. A., 9
 Cowgill, Helen J., 31
 Cramer, A. P., 25
 Crocker, H. G., 25
 Cyrus, Amy, 28

 Daigh, C. W., 32
 Dareljus, Mabel R., 28
 Darlington, L., 22
 Davis, Anita K., 25
 Davis, Helen L., 11
 Dean, H. K., 30
 Dearborn, R. H., 10
 Dixon, Belva, 23
 Dobell, C. A., 27
 Dolan, S. M. P., 14
 Donham, C. R., 23
 Dreesen, W. H., 14
 Drill, H., 21
 Dubach, U. G., 9, 10
 Duncan, C. W., 23
 Dunham, B. L., 21
 Dunphy, Harriet H., 29
 DuPriest, J. R., 12

 Edwards, F. M., 31
 Edwards, P. L., 23
 Ellison, J., 25
 Engbretson, A. E., 30

 Fairbanks, J. L., 13
 Fasten, N., 12
 Fletcher, L. A., 25
 Fletcher, O. S., 32
 Flora, Elizabeth, 23, 28
 Fowler, R. G., 32

 Fox, F. E., 16
 Frick, Minnie D., 21
 Fulton, J., 9
 Funk, Vera, 28

 Gabrielson, I. N., 31
 Gain, M. Jane, 23
 Gardner, H. H., 25
 Garman, J. C., 24
 Garnjobst, Laura, 24
 Gibson, H. H., 12
 Gilbert, E., 15
 Gilfillan, F. A., 15
 Gilkey, Helen M., 16
 Gillis, M. A., 19
 Gilmore, W. J., 11
 Glenn, B., 17
 Goodding, L. N., 30
 Goode, D. M., 28
 Graf, S. H., 12
 Granning, M. L., 20
 Griswold, Jessie A., 32

 Hadwen, Sibylla, 12, 28
 Hager, R. H., 16
 Hague, Florence S., 18
 Haight, Katherine, 20, 28
 Hale, Laura C., 29
 Haley, Lucia, 29
 Hall, S. B., 32
 Halversen, W. V., 15, 30
 Ham, O., 24
 Harsch, J., 21
 Hartman, H., 15, 30
 Hartung, Hulda, 25
 Harvey, E. M., 11, 29
 Harvey, J. P., 18
 Harwood, A. C., 21
 Hay, Leila, 29
 Heath, Laura B., 28
 Henderlite, C. E. V., 24
 Henderson, C. A., 32
 Herbert, Elzie V., 29
 Herse, Bertha, 29
 Hewitt, R. R., 17
 Higby, W. M., 25
 Hill, G. H., 20
 Himmelsbach, Dora, 29
 Hite, Bertha C., 30
 Hobbs, E. C., 28
 Holcomb, G. W., 21
 Holgate, Helen L., 28
 Holt, W. A., 32
 Hopkins, L. B., 25
 Horner, J. B., 9
 Horning, W. H., 21
 Horton, R., 31
 Howard, Lula, 28
 Howell, H. B., 32
 Howells, H. P., 23
 Hubbard, C. W., 23
 Hull, Mary Bowman, 28
 Humfeld, H., 31
 Hunter, F. G., 21
 Hurd, C. J., 31
 Hyslop, G. R., 10, 29

- Ingalls, Eleanor C., 23
 Irvine, H. S., 28
 Irvine, J. H., 21
 Jackman, E. R., 31
 Jackson, E. P., 27
 Jameson, Kate W., 9, 28
 Jamison, N. C., 31
 Jardine, J. T., 9, 29
 Jensen, A. E., 20
 Jensen, W. A., 9, 27
 Johnson, A. Grace, 11
 Johnson, C. L., 10
 Johnston, W. W., 18, 30
 Jones, R. C., 14, 30
 Jones, S., 11, 29
 Jones, W. B., 24
 Jordan, J., 17
 Kay, Helen B., 25
 Kable, G. W., 31
 Kadderly, W. L., 31
 Kearns, W. A., 13
 Keene, R. S., 25
 Keiser, Lura A., 20
 Kennedy, D. H., 32
 Kent, F. C., 14
 Kerr, W. J., 9, 27, 29, 31
 Kierzek, J., 18
 Kinder, W. D., 32
 Kirkpatrick, T. D., 32
 Knowlton, F. L., 30
 Kuehn, L. E., 25
 Larson, R. G., 32
 Latson, H., 13
 Lautermische, Margery, 27
 Lawrence, W. E., 14
 Lawsing, Margaret, 25
 Lay, C. F., 15
 Lemon, E. B., 27
 Lewis, J., 23, 30
 Lewis, Lucy M., 29
 Lindgren, H. A., 31
 Livingston, D. C., 11
 Livingston, Laura E., 28
 Lockenour, R. M., 25
 Lodell, C. A., 28
 Long, C. L., 31
 Lothrop, R., 22
 Lovett, R. G., 20
 Lunn, A. G., 12, 29
 Lyle, Mary, 26
 McComb, Jessie D., 31
 McCormick, T., 19
 McDonald, W. T., 32
 McElfresh, Gertrude E., 18
 McIntosh, C. J., 14
 McKay, M. B., 29
 MacManus, E., 22
 MacManus, Marguerite, 13
 McMillan, F. O., 15
 McMindes, E. W., 32
 McWhorter, O., 32
 Maclay, Eleanor, 16
 Macpherson, H., 10
 Maginnis, Etha M., 16
 Magruder, F. A., 14
 Maris, P. V., 9, 31
 Marker, A. W., 21
 Marsh, Hilda F., 29
 Martin, Melissa M., 19
 Martin, W. H., 12
 Mason, E. G., 17
 Matthis, C. R., 28
 Mehlig, J. P., 19
 Meloy, Kathleen, 24
 Milam, Ava B., 9
 Miller, F., 18, 30
 Miller, H. G., 29
 Minton, J. T., 18
 Mitchell, C. B., 12
 Mitchell, G. A., 31
 Mittelman, E. B., 16
 Mockmore, C. A., 22
 Moore, F. D., 22
 Moore, Harriet F., 26
 Moore, Helen, 27
 Morehouse, Margaret, 20
 Morgan, F. B., 21
 Morris, V. P., 26
 Morse, R. W., 32
 Morton, Josephine, 29
 Moses, G. W., 9
 Mote, D. C., 13, 30
 Mowat, E. L., 26
 Murray, Hazel C., 24
 Murray, Nettie, 26
 Neff, J. A., 26
 Nelson, G. A., 32
 Nelson, O. M., 12, 30
 Newton, C. E., 9
 Nichols, A. R., 16
 Nichols, B. H., 21
 Norris, R., 31
 Odell, H. R., 13
 Oliver, A. W., 18, 30
 Olds, Gertrude C., 29
 O'Neale, Lila M., 16
 Osborn, J. L., 24
 Osborn, R. A., 26
 Othus, J. C., 22
 Owens, C. E., 14
 Page, J. F., 19
 Palm, Elizabeth M., 29
 Patterson, H. R., 12
 Peabody, Margaret, 27
 Peavy, G. W., 9
 Peck, A. L., 10, 27
 Peterson, Gladys, 26
 Peterson, S. H., 14
 Petri, Lillian J., 13
 Petri, P., 13
 Pettengill, G. F., 23
 Phelan, E. W., 24
 Phillips, M. C., 16, 27
 Pine, W. D., 32
 Potter, E. L., 10, 29
 Powers, J. L., 19
 Powers, W. L., 10, 29
 Prentiss, Sara W., 20
 Price, F. E., 31
 Pumphrey, Essie B., 26
 Rankin, Lois J., 21
 Reed, E. T., 28, 29
 Reed, R., 26
 Reimer, F. C., 31
 Ressler, E. D., 9
 Richards, C. R., 32
 Richards, E. D., 32
 Ridenour, A. E., 20
 Ritchie, Elizabeth P., 29
 Robertson, W. R., 15
 Robinson, D. A., 13
 Robinson, F. L., 19
 Robinson, R. H., 30
 Rodenwold, B. W., 17
 Rodenwold, Zelta F., 28
 Rogers, H. S., 12
 Rondeau, S. H., 27
 Rotchy, Rose M., 29
 Rowland, F. E., 12
 Russey, J. W., 19
 Ruth, C. C., 16, 30
 Ruzek, C. V., 12, 30
 Sander, A. R. C., 19
 Schissler, P. J., 26
 Schmitt, A., 13
 Schoth, H. A., 26, 30
 Schuster, C. E., 15, 30
 Schwartz, A., 19
 Scott, Bertha, 28
 Scott, J. C., 23
 Scott, W., 14
 Scudder, H. D., 10, 29
 Scullen, H. A., 17
 Seering, H. A., 26
 Sexton, F. W., 32
 Seymour, H. C., 31
 Shattuck, O., 30
 Shea, T. F., 24
 Shupe, Margaret, 27
 Sievers, Minnie, 28
 Simmons, J. E., 17
 Simms, B. T., 10, 29
 Sims, S. H., 11
 Sipe, F. P., 24
 Skelton, G. V., 10
 Skinner, W. V., 26
 Smith, D. R., 17
 Smith, E. H., 23
 Smith, E. M., 27
 Smith, M. E., 9
 Smith, Margery M., 31
 Snow, F. L., 11
 Spear, H. C., 21
 Stahl, Fay F., 29
 Starker, T. J., 13
 Stason, Margaret, 22
 Stephens, D. E., 30
 Stephenson, R. E., 15, 30

Stevens, Blanche W., 22	Turner, J. T., 26	Wiegand, E. H., 12, 29
Stewart, Ruth C., 28	Vance, H. T., 11	Wight, H. M., 17
Stiles, Janie, 28	Vance, Jean, 24	Wilcox, L. P., 22
Strickland, Gertrude, 21	Vance, Sara, 27	Wilkes, C., 20
Stuart, D. B., 27	Van Fleet, George, 27	Wilkinson, Edith M., 26
Studer, Marguerite M., 21	Van Groos, J. A., 17	Willey, E. C., 22
Sturges, Nettie L., 24	Van Kirk, Mary S., 20	Williams, G. A., 22
	Vasanoja, Hertta E., 24	Williams, Jessamine, 13
Tartar, N., 16	Vaughn, E. V., 15	Wiltshire, C. G., 20, 27
Tatum, F. A., 24	Von Lehe, H., 23	Withycombe, R., 30
Taylor, Lillian C., 21		Woodbury, C. C., 22
Teutsch, W. L., 32	Wait, Bernice C., 22	Woodbury, J. C., 26
Thayer, D. G., 20	Wangen, Minnie J., 24	Woodward, H. M., 19
Thayer, Ruth, 23	Warrington, E. W., 28	Wooster, L. F., 12
Thomas, C. E., 15	Watenpaugh, H. N., 31	Workinger, C. May, 28
Thompson, B. G., 30	Waterman, I. F., 17	Xauten, Jeannette B., 27
Thornely, Doris M., 17	Weld, Emma S., 20	Yates, W. W., 30
Thurber, Evangeline, 29	Wells, E. W., 22	Young, F. E., 23
Thurber, F. H., 15	Weniger, W., 12	Young, V., 27
Torgerson, E. F., 16, 30	Wenk, M., 17	Yunker, E. A., 27
Tucker, H. H., 22	Whillock, Bertha A., 19	Zeller, S. M., 30
Tucker, Wesleya, 29	Whipple, Gladys L., 21	Ziefe, A., 9
Tucker, W. B., 32	White, G. H., 13	
Turner, H. H., 26	White, H., 24	

GENERAL INDEX

Accounting .....215-218, 408-409	Archery 374
Accounting and Management.....195-196	Argumentation 185
Accredited Farm Work 115	Art and Rural Architecture.....139-146, 416
Adams Fund 68	Assaying .....305-306
Administration 53-55	Associations, <i>see</i> Organizations
Administrative Council 8, 53	Astronomy, <i>descriptive</i> 181
Admission, School of Music..... 379	Athletic Field 366
Admission to the College.....33-36, 395	Athletics .....369, 374
Advanced Standing 35-36	Auditing .....216, 388
Advertising and Selling .....196, 217-218	Automobile Mechanics.....251-252, 410
Advisory Committee on Banking 213	
Agricultural Bacteriology 83-84	Bacteriology 83-84, 146-149, 429
Agricultural Chemistry.....84, 159, 427-428	Band 378
Agricultural Economics 210	Band Instruments .....390-391
Agricultural Education.....84-85, 329-332	Banking and Finance .....197, 218-219
Agricultural Engineering..... 98-101	Baseball .....368, 412
Agriculture, Minor in.....201-202	Basic Arts and Sciences, School
Agriculture, School of.....78-135	of .....136-189, 416
Algebra 175	Basket-ball .....368, 412
Alkaloidal Testing 160	Bee Culture 170
Alternating Currents 241	Bell Field 336
Alumni Association .....436-438	Blacksmithing .....253-254
American Conference of Pharma- ceutical Faculties 311	Block Printing and Stenciling..... 143
American Government 224	Board and Room 42-74
American History 172	Board of Control 72
American Literature 167	Board of Regents 7, 53
Analysis, Elementary 175	Botany and Plant Pathology.....
Analysis of Accounts 217	.....86, 150-156, 429-430
Anatomy of the Fowl .....126-134	Boys' and Girls' Club Work.....419-421
Animal Husbandry 85-86, 101-104, 428-429	Branch Stations (Experiment)...432-433
Animal Nutrition 103	Breeding Dairy Cattle 107
Animal Parasites 189	Breeds of Livestock 102
Apparatus Work 373	Bridge Design .....277-278
Application of Plant Science..... 155	Buildings (<i>see also</i> Map, p. 4)—
Applied Sociology .....209-210	Administration 56
Appointments Office .....327, 399	Agriculture Hall 59
	Apperson Hall 61
	Armory 57

Cattle Barn	65	Clothing and Textiles	288-289, 290
Cauthorn Hall	64	Clothing Selection	289-290
Commerce Hall	61	Club Work and Agriculture in the Elementary School	331
Dairy Barn	65-66	College Council	53-54
Dairy Building	60	Color Harmony	140
Engineering Laboratory	61	Color Rendering	144, 416
Farm Mechanics Building	60	Commerce, School of	190-228, 407-410
Forestry Building	62	Commercial Amateur Finishing	180
Foundry	62	Commercial Bee Culture	169-170
Greenhouses	59	Commercial Buttermaking	106
Heating Plant	67	Commercial Education	197-198
Hog Barn and Feeding House	66	Commercial Geography	204, 332-334
Home Economics Building	62-63	Commercial Jam and Jelly Man- ufacture	206
Home Management House	63	Commercial Pharmacy	319-320
Horse Barn	66	Commercial Photography	182
Horticultural Products Build- ing	59	Commercial Pomology	117
Library Building	56	Commercial Truck Gardening	121
Margaret Snell Hall	64	Commercial Woods	274
Mechanic Arts Building	62	Community Drama	145, 186-187, 418
Men's Dormitory	65	Commutation of Subsistence	355
Men's Gymnasium	57	Comparative Anatomy	134
Military Stables	66	Comparative Governments	223
Mines Building	63	Comparative Morphology and Evolution of Plants	154
Pharmacy Building	64	Comparative Physiology	134
Poultry Houses	67	Composition (Music)	385
Science Hall	56	Concrete Building Design	239
Shepard Hall	58	Concrete Construction	100
Stock Judging Pavilion	60	Conservation	207, 408
Veterinary Building	60	Contemporary English Drama	168
Waldo Hall	64-65	Continental European Liter- ature	168, 418
Women's Gymnasium	57	Contracts and Specifications	245
"Y" Hut	57-58	Cookery	294
Bulletins	70	Cooperation	211-212
Business Correspondence	165, 417	Cornet	390-391
Business Cycle	208-209	Corporation Accounting	215-216
Business English	165	Corporation Finance	219, 409
Business Law	221-222, 409	Corporation Law	222
Business Management	220	Corrective Gymnastics	372
Business Organization	219-220, 409	Cost Accounting	216
Buttermaking	106	Cost of a Year at the College	42
Cabinet Work	251	Cost of Production	114
Cadet Officers	357	Costume Design	290, 406
Cafeteria Management	296	Counterpoint	384
Calculating Machine Course	174	C. P. A. Problems	217
Camp Cookery	294, 407	Credit, term	36
Canning	123-124	Credits and Collections	218-219
Carpentry	253	Credits (Music)	38
Cavalry	363	Credits (Summer Session)	396, 398
Cement Casting	144	Crop Handling Equipment	99-100
Cereal Production	109	Crops	109, 110, 111
Cheesemaking	107	Crystallography	301-302
Chemical Engineering	342-345	Curriculum for Women (Agriculture)	97
Chemistry	156-163, 416-417	Curves and Earthwork	238
Chemistry of Foods and Digestion	157	Dairy Bacteriology	148
Child Care	287, 404	Dairy Breed Types	106, 107, 108
Child Mind, the	340, 400	Dairy Herd Management	106-107
China Painting	143	Dairy Husbandry	87, 105-108, 430
Christian Associations	73-74	Dairy Mechanics	100
City Planning	245	Dairy Products Judging	106-108
Civil Engineering	231-232, 235-240	Dairy Refrigeration	261
Clarinet	391		
Clay Modeling	143-144		
Climatology	131		

Dancing	372-373, 374, 414	Engineering Physics	180, 181
Debating	186	Engineering Problems.....	236-237, 241, 257
Degrees and Certificates	38-39	Engineering, School of	229-265
Dehydration of Fruits and Vegetables	124	English Examination Required....	37
Dendrology	276	English Language and Literature	164-168, 417-418
Departmental Management	127-128	Enterprise Costs and Profits	114
Deposits	41	Entomology	88, 168-172, 430
Descriptive Astronomy	181	Equipment (see respective de- partments and buildings)	
Design	140, 141-142, 143	Essay	166
Diagnosis, Physical	376	Ethics	341
Diet in Disease	294	Eugenics	189
Dietetics	292	Excavation, Explosives	307, 308
Differentials	176	Exercise, Physiology of	375
Direct Currents	241	Expenses, Student	40-45, 396-397
Diseases of Field Crops	153	Experiment Station	427-433
Diseases of Livestock	134, 135	Experimental Cookery	294
Diseases of Poultry	135	Explosives	307, 308
Dormitories	42-44	Expression	185
Drainage	129, 130	Extension Course in Teacher Training	331-332
Drama	168, 186	Extension Service	434-435
Dramatic Interpretation	186	Factory Organization and Man- agement	107
Drawing	140, 141, 142	Faculty, see Staff	
Dress Design	290-291	Farm Accounting	216-217
Dressmaking	405	Farm Conveniences	100
Drug Assaying	160	Farm Crops	88-89, 108-112, 430
Dry Farming	130	Farm Implements	99
Dynamics	264	Farm Management	89-90, 112-115, 430-431
Economic Entomology	169-170, 171	Farm Organization	113
Economic Geography	212	Farm Structures	101
Economic Geology	304, 305	Feeds and Feeding	103
Economic History	206	Fees, General	40-41
Economic Organization of Agri- culture	210	Fencing	373
Economics and Sociology.....	198, 204-212, 408	Field Artillery	361-362
Economics of Highway Con- struction	245	Finance and Administration.....	212-221, 408-409
Economics of the Lumber Industry	275	Finance, Public	208
Editing	338	First Aid	367, 374
Education	334-336, 396	Fish and Game Propagation	188
Education, Agricultural	84-85, 329-332	Floriculture	122-123
Education, Vocational	400-404	Food and Drug Analysis	160-161
Educational Psychology	340, 400	Food Economics	293
Efficiency Systems	274	Food Products	124
Elastic Deformations and Sec- ondary Stresses	240	Food Selection and Prepara- tion	292, 293, 294, 406
Electric Lighting	242	Forage Crops and Root Crops....	110
Electric Railways	242-243	Foreign Trade	211
Electrical Application	241	Foreman Training	339, 403
Electrical Design	242	Forensic and Dramatic Organizations	74-75
Electrical Engineering.....	232-233, 240-243	Forest Administration	273-274
Electrical Laboratory	242	Forest Entomology	170, 171
Electricity	183	Forest Finance	275
Electrochemical Industries	345	Forest Insect Problems	171
Electrometallurgy	207	Forest Management	275
Embryology	188	Forest Pathology	153
Employment Management	208	Forest Protection	272
Engineer Corps	362-363	Forest Survey and Mapping.....	273
Engineering Chemistry	344	Forestry, School of	266-278
Engineering Drawing	237	Forging	254-255
Engineering Laboratory	262	Foundry Practice	253, 255
Engineering, Military	359-360		
Engineering, Minor in	202		

- French 177-178
 Fruit Diseases 153
 Fruit Juice Manufacture 124
 Fuels and Lubricants 265
 Funds, Loan 45-47
 Fur Farming 187
 Gas Engines 259, 261
 General Business 199
 General Economics 206-209
 General Forestry 269-270, 272-276
 General Information 33-77, 395-396
 General Organizations 72-73
 Genetics 189
 Genetics, Plant 118-119
 Geodesy 238
 Geography, Commercial 204, 332-334
 Geology 301-305
 Geometry 258
 German 179
 Gesso and Leather Tooling 143
 Glass Blowing 161
 Glee Club 378-379
 Government 222-224
 Governmental and Institutional
 Accounting 217
 Graduate Work 38-39
 Graphic Methods 99
 Grazing Assistant 151-152
 Greater O. A. C. Association 73
 Greenhouse Construction 122
 Greenhouse Crops 123
 Greenhouses 59
 Grounds and Buildings 67
 Gymnastics, *see* Physical Educa-
 tion
 Halls of Residence 42-44
 Hammered Metal Work 255
 Harmony 383-386
 Health Service 49
 Heat Engineering 258-259, 260
 High Voltage Engineering 243
 Highway Engineering 243-245
 Highway Materials Laboratory 264
 Highway Transportation 245
 Histology 188
 Historical Geology 302, 303
 History 172-174
 History, Economic 206
 History of Education 334-335
 History of Horticulture 117
 History of Latin America 173
 History and Literature of Land-
 scape Gardening 121
 History and Organization 50-55
 History, Military 360
 History of Music 383
 History of Oregon 173
 History of Physical Education 367, 375
 History of Western Civilization 172-173
 Home Economics 404-407
 Home Economics Education
 285-286, 336
 Home Economics, Minor in 202
 Home Economics, School of 279-296
 Home Management House 287-288, 405
 Home Nursing 287
 Home Planning 291-292
 Home Station (Experiment) 427-432
 Honor Societies 76-77
 Horticultural Products 90-91, 123-125
 Horticulture 90-94, 116-125, 431
 House Decoration 406
 House Planning 146, 416
 Household Administration
 286-288, 404-405
 Household Art 288-292, 405-406
 Household Science 292-294, 406-407
 Housewifery 287
 Housing Committee 44
 Hydraulics and Irrigation
 Engineering 245-248
 Hydrology 246
 Hygiene 367, 372, 376
 Hyperbolic Functions 176
 Ice-cream 107
 Identification of Plants 152-153
 Identification of Woods 274
 Immunity and Serum Therapy 149
 Income of the College 67-74
 Income Tax Procedure 216
 Incubation and Brooding 126
 Industrial Arts
 234-235, 248-256, 339, 410
 Industrial Education 337-339
 Industrial Inorganic Chemistry 344
 Industrial Journalism 346-348, 411
 Industrial Journalism, Minor in 203
 Industrial Lighting 242
 Industrial Organic Chemistry 344-345
 Infantry 360-361
 Inorganic Pharmacy 321
 Insects 170, 171
 Insurance 207
 Institutional Cooking and
 Marketing 295
 Institutional Management 295-296
 Integral Calculus 176
 Interior Decoration 291
 International Relations 223
 Interpretation of Geologic Maps 304
 Investment, Mathematics of 174
 Investments 219
 Irrigation 101, 130, 131, 133, 248
 Jam and Jelly Manufacture 124
 Jewelry Making 145
 Journalism Practice 346-347, 348, 411
 Junior Certificate 38
 Kinesiology 368, 375
 Labor Problems 207
 Laboratory Hours, Maximum
 number of 37-38
 Land Clearing 100
 Land Drainage 130
 Land Economics 114-115
 Land-grant 50-52
 Landscape Gardening 91-92, 121-122

Late Registration	40	Mines, School of	297-309
Law, Oregon Pharmacy	311-312	Mining Engineering	299-300, 307-309
Law, Oregon Physical Education	365-366	Mining Machinery	308
Library	349-351	Mining Methods	308
Library Practice	350-351	Minor	38
Linear Drawing and Lettering	257	Minor Seminar in Chemistry	162
Literature and Exposition of		Modern Languages	177-179
Rural Life	210	Money and Banking	207
Lithology, or Rock Study	303	Municipal Engineering and City	
Livestock	102, 103, 104	Planning	245
Loan Funds	45-47	Municipal Government	223
Location	50	Music, School of	377-391, 421-425
Logging Engineering	267, 270-271, 276-278	Musical Organizations	76, 378
Lumber Manufacture	268, 271, 278	Mycology	154
Lyceum Club	75	Narrative Writing	165-166
Machine Design	261	National Formulary, U. S. Phar-	
Machine Shop	254-255	macopoeia and	321
Major	38	National Government	222-223, 409
Mammalian Anatomy	188	National Vitality	209
Mandolin and Guitar Club	76	Normal Work	36
Manual Arts, Theory and		Natural Products and Drug Prin-	
Practice	338	ciples	320
Manual Training	337-338, 403	Novel	166
Manufacturing Pharmacy	322	Nut Culture	118
Market Business Practice	220	Nutrition	294, 407
Market Milk	106	Nutrition, Animal	103
Marketing	211-212	O. A. C. Alumni Association	436-438
Marketing of Agricultural Prod-		Ocean Transportation	211
ucts	94-95, 200	Office Methods and Appliances	227
Marketing Manufactured Goods	212	Office Training	226-227
Marketing Poultry Products	127	Official Publications	70
Marketing, Vegetable	120-121	Oil Geology	305
Markets and Marketing	199, 212, 408	Olericulture	120
Massage	376	Optional Students	35
Masonry and Foundations	238	Oratory	186
Materia Medica	322	Orchard Machinery	100-101
Materials of Engineering	263	Orchard Practices and Manage-	
Mathematics	174-176	ment	118
Mathematics of Investment	174	Orchestra	378
Mathematics of Statistics	176	Orchestration	386
Meats	103-104	Ore Dressing	306
Mechanical Drawing	255-256, 258	Oregon Law Relating to the	
Mechanical Engineering	233-234, 256-263	Practice of Pharmacy	311-312
Mechanics and Materials	263-265	Oregon Physical Education Law	365-366
Mechanism	258	Oregon State Society of Public	
Mensuration	272-273	Accountants Scholarship	49
Metallography and Pyrometry	265	Organ	387-388
Metallurgy	305-307	Organic Analysis	159
Methods of Research	125	Organic Chemistry	157, 159, 161, 163, 416
Military Credits for Graduation	356	Organization and Administration	
Military History	360	of Commercial Education	333
Military Science and Tactics	37, 256, 352-363	Organization and Administration	
Military Science Required	37	of Physical Education	333, 369, 375
Milk Production	107	Organization and Management	219-221
Mill Work	253	Organizations, Student	72-77
Millinery	290, 406	Ornithology	188
Mine Economics	309	Other Colleges, Admission from	35-36
Mine Management	308	Parliamentary Drill	185-186
Mine Plant Design	309	Pathogenic Bacteriology	149
Mine Power Equipment	309	Patternmaking	252-253
Mine Surveying	308	Pedagogy (Music)	385
Mineralogy	301-302	Pedigree Study	104

- Pencil and Pen Rendering..... 142
 Petrography303-304
 Pharmaceutical Botany 152
 Pharmaceutical Calculations 320
 Pharmaceutical Preparations 320
 Pharmacognosy320-321
 Pharmacy as a Profession for
 Women 313
 Pharmacy, School of310-323
 Photography180, 181-182
 Photometry 183
 Physical Chemistry161, 162
 Physical Diagnosis 376
 Physical Education for Men.....
 364-369, 395, 411-413
 Physical Education for Women.....
 370-376, 395, 413-415
 Physical Education, Minor in.....202-203
 Physical Education Required..... 37
 Physics179-183
 Physics of Light Production..... 183
 Physics, Soil131-132
 Physiological Chemistry 162
 Physiology of Exercise 375
 Physiology, Zoology and187-189
 Piano381, 382, 386, 387, 423
 Piano and Organ Practice 381
 Pickles, Relishes, and Condi-
 ments 124
 Plane Surveying237, 238
 Plane Trigonometry 175
 Plant Biochemistry 160
 Plant Ecology154-155
 Plant Genetics118, 119
 Plant Histology 155
 Plant Identification152-153
 Plant Materials 121
 Plant Pathology, Botany and.....150-156
 Plant Physiology153-154
 Plant Propagation 122
 Playground and Gymnastic
 Games 375
 Political Science
 200-201, 221-224, 409-410
 Pomology92-93, 117-119
 Potato Growing 110
 Pottery143-144
 Poultry Breeding, Breeds and
 Judging 126
 Poultry Diseases 127
 Poultry Feeding 127
 Poultry-house Design and
 Construction 127
 Poultry Husbandry
 95-96, 125-128, 432
 Poultry Keeping 126
 Poultry Plant Management..... 127
 Power-plants261-262
 Practical Legislation 224
 Practical Pharmacy 320
 Practice of Pharmacy, Oregon
 Law Relating to311-312
 Practice Teaching 376
 Precise Surveying and Geodesy.. 238
 Pre-Medical Curriculum315-316
 Prescriptions322-323
 Present-Day American Poetry...167-168
 Preserves124-125
 Private Board 44
 Prizes 48-49
 Pruning and Spraying 117
 Psychology339-341
 Public Finance 208
 Public Speaking and Dramatics
 183-187, 418
 Publications, Official 70
 Publications, Student 70-72
 Purchasing 218
 Purpose and Scope 52-53
 Qualitative Analysis 158
 Quantitative Analysis158-159, 161
 Radio181, 182
 Railroad Engineering238-239
 Railway Electrification 243
 Range and Pasture Botany 154
 Recent Developments in Elec-
 tricity 183
 Recent History of the U. S. 172
 Reclamation Engineering 248
 Regular Students 33-35
 Regulations36-38, 380-381
 Reinforced Concrete 239
 Repairs, Farm 99
 Reporters' Course 227
 Representative Men and Women 173
 Required English Examination... 37
 Required Subjects 37
 Requirements for Degrees 38-39
 Requirements for Graduation... 80
 Requirements of Pharmaceutical
 Profession 311
 Research 125
 Retail Advertising 218
 Retail Selling217-218
 Risk Bearing 219
 Roads and Pavements 244
 Room and Board 42-44
 R. O. T. C.354, 355
 Rules and Regulations 36-38
 Rural Architecture139, 145-146
 Rural Economics and Sociology..210, 211
 Rural Education 331
 Rural Finance210-211
 Rural Markets and Rural Organ-
 ization204-206
 Rural School Surveys 331
 Rural Sociology 211
 Rural Survey 211
 Scholarships48, 49, 377
 School Administration 335
 School Hygiene 335
 Schoolroom Games and Gymnas-
 tics for Rural School Teach-
 ers369, 413
 Schools—
 Agriculture78-135
 Basic Arts and Sciences136-189
 Commerce190-228
 Engineering229-265
 Forestry266-278

Home Economics	279-296	Sub-tropical Pomology	117
Mines	297-309	Summer Session	392-425
Music	377-391, 421-425	Supervised Teaching	286, 330, 331, 333, 336, 338, 339
Pharmacy	310-323	Survey, Rural	211
Vocational Education	324-341	Surveying	237, 238, 308
Scoutmastership	415	Swimming	367, 373, 374, 412, 414
Secondary Education	285, 286, 330, 333, 336, 400-401, 403	Swimming Compulsory	365
Secretarial Studies	227-228	Systematic Olericulture	120
Secretarial Training	201, 224-228, 410	Systematic Pomology	117-118, 119
Seed Production	111	Tailoring	291
Seed Testing	110	Taxidermy	189
Self-support	44-45	Teaching of Entomology	171
Semi-Arid Farm Management.....	113	Teaching, Principles of	334
Shop Drawing	252	Tea-room Management	295
Short Courses and Conferences..	426	Technical Clubs	76
Short-Story	166	Technical Composition	164, 417
Sign-Card Painting	319-320	Technical Forestry	267
Silviculture	274-275	Technical Journalism	347-348
Singing	388-389	Term Credit	36
Small Fruits and Grapes	118	Testing	106
Social Ethics	372	Textile Identification	159
Sociology, General	201-202	Textiles	291, 405
Soils	95-96, 128-133, 148-149	Theoretical Pharmacy	319
Spanish	178	Therapeutics	376
Special Students	35	Three Grand Divisions	52
Sports	365	Timber Technology	276
Staff--		Timber Transportation	276-277
<i>General Roster</i>	8-32	Tool Making and Tempering.....	254
<i>Index of Names</i>	440-442	Topographic Logging Plans.....	277
Agriculture	78-79	Town Planning	122
Basic Arts and Sciences.....	136-138	Track and Field	368, 412
Chemical Engineering	342	Tractors	98
College	54	Trades and Industries.....	337
Commerce	190-191	Transportation	208
Engineering	229-230	Tree Identification	273
Experiment Station	54, 427	Trigonometry	169
Extension Service	54-55, 434	Trombone	391
Forestry	266	Truck Gardening	121
Home Economics	279-280	Trusses and Towers	240
Industrial Journalism	346	Tuition, School of Music	381, 422
Library	349	Typing	226, 410
Military	352-353	Uniforms Provided	354
Mines	297	U. S. Pharmacopoeia and Na- tional Formulary	321
Music	421	Uses of Wood	274
Pharmacy	310	Vegetable Forcing	120
Physical Education	364, 370	Vegetable Gardening	93-94, 119-121
Summer Session	392-394	Vinegar Manufacture	124
Vocational Education	324	Violin	382, 389-390, 424
State and Local Government.....	223, 409	Vocational Education, School of	324-341, 400-404
Statics	264	Vocational Guidance	335
Statistics	176, 439	Vocational Psychology	340
Steam and Gas Machinery	259	Voice	422-423
Stenography	225-226, 410	Water-Color	142
Stock Judging	102, 103, 104	Water Power Engineering	248
Strength of Materials	264	Weed Eradication	110
Structural Engineering, Design, Analysis	238, 239	Western Land and Water Laws	130
Structural Geology	303	Wood and Steel Structures	240
Structural Laboratory	265	Wood Turning	254-255
Students, Associated	72	Zoology and Physiology	96, 187-189
Student Expenses	40-45	Zymology and Fermentations.....	147-148
Student Housing Committee	44		
Student Loan Fund	45-46		
Student Organizations	72-77		
Student Publications	70-72		
Student Government	55, 72, 73		