

*The Bulletin of the*  
UNIVERSITY *of* MINNESOTA

Institute of Technology  
1941-1942

Volume XLIV, Number 34

May 15, 1941

## UNIVERSITY CALENDAR

1941-42

### *Fall Quarter*

1941			
September	18	Thursday	Payment of fees closes for students in residence spring quarter in the Institute of Technology
September	22	Monday	Entrance tests
September	22-23		Registration for Freshman Week for all new stu- dents entering the freshman class
September	22-26		Examinations for removal of conditions Physical examinations
September	24-27		Freshman Week
September	25-26		Registration days <sup>1</sup> for all students in the Institute of Technology. Time of payment of fees closes for new students
September	29	Monday	Fall quarter classes begin 8:30 a.m. <sup>2</sup>
October	16	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Homecoming Day
November	5	Wednesday	Mid-quarter grades due
November	8	Saturday	Dads Day
November	11	Tuesday	Armistice Day; a holiday
November	20	Thursday	Thanksgiving Day; a holiday
December	12-13 and 15-18		Final examination period
December	18	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends 6:00 p.m.

### *Winter Quarter*

December	26	Friday	Payment of fees closes for all students in residence fall quarter in undergraduate colleges
1942			
January	2	Friday	Entrance tests
January	3	Saturday	Registration day for all students in the Institute of Technology. Time for the payment of fees by new students closes at 12:00 noon.
January	5	Monday	Winter quarter classes begin 8:30 a.m. <sup>2</sup>
February	5	Thursday	Mid-quarter grades due
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	23	Monday	Washington's Birthday; a holiday
March	13-14 and 16-19		Final examination period

See footnotes on page 3.

March	19	Thursday	Commencement Convocation Payment of fees closes for all students in residence winter quarter in undergraduate colleges Winter quarter ends 6:00 p.m.
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*Spring Quarter*

March	27	Friday	Entrance tests
March	28	Saturday	Registration day for all students in the Institute of Technology. Time for the payment of fees by new students closes at 12:00 noon.
March	30	Monday	Spring quarter classes begin 8:30 a.m. <sup>2</sup>
April	3	Friday	Good Friday; a holiday
April	30	Thursday	Mid-quarter grades due
May	9	Saturday	Mothers Day
May	14	Thursday	Cap and Gown Day Convocation Senate meeting, 4:30 p.m.
May	30	Saturday	Memorial Day; a holiday
June 5-6 and 8-12			Final examination period
June	7	Sunday	Baccalaureate service
June	12	Friday	Spring quarter ends 6:00 p.m.
June	13	Saturday	Seventieth annual commencement

*Summer Session*

June	15-16		Registration, first term. Payment of fees closes at 4:00 p.m. June 16 for all colleges
June	17	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
July	23	Thursday	Commencement Convocation
July	24	Friday	First term closes
July	27	Monday	Second term registration and payment of fees close at 4:00 p.m. July 27 for all colleges Second term classes begin 8:00 a.m.
August	28	Friday	Second term closes

*Entrance Examinations*

Entrance examinations for admission to the Institute of Technology will be conducted for students whose credentials do not meet the requirements.

Candidates wishing to take any of these examinations should notify the registrar in writing not later than September 1 or December 1.

For further information concerning these examinations see "Admission by Examination," page 21.

<sup>1</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 23. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>2</sup> First hour classes begin at 8:15 a.m. at University Farm.

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EMBRACING THE COLLEGE OF ENGINEERING AND ARCHITECTURE, THE  
SCHOOL OF CHEMISTRY, AND THE SCHOOL OF MINES AND METALLURGY

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 Alfred O. C. Nier, Ph.D., Associate Professor of Physics  
 Lynn H. Rumbaugh, Ph.D., Associate Professor of Physics  
 Otto H. Schmitt, Ph.D., Associate Professor of Physics  
 Joseph Valasek, Ph.D., Associate Professor of Physics  
 John H. Williams, Ph.D., Associate Professor of Physics  
 John Bardeen, Ph.D., Assistant Professor of Physics  
 Wilfred W. Wetzel, Ph.D., Assistant Professor of Physics

## POLITICAL SCIENCE

William Anderson, Ph.D., Professor of Political Science and Chairman of the Department  
 Asher N. Christensen, B.A., Associate Professor of Political Science  
 Clarence C. Ludwig, M.A., C.P.A., Associate Professor of Political Science  
 Evron M. Kirkpatrick, Ph.D., Assistant Professor of Political Science

## ZOOLOGY

Dwight E. Minnich, Ph.D., Professor of Zoology and Chairman of the Department  
 Jerry E. Wodsdalek, Ph.D., Professor of Zoology  
 Ralph Dawson, Ph.D., Assistant Professor of Zoology  
 Magnus Olson, Ph.D., Instructor in Zoology

## COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

## AGRICULTURAL BIOCHEMISTRY

Ross A. Gortner, Ph.D., D.Sc., Professor of Agricultural Biochemistry and Chief  
 of the Division  
 Clyde H. Bailey, Ph.D., Professor of Agricultural Biochemistry and Acting  
 Director of Experiment Station  
 William F. Geddes, Ph.D., Professor of Agricultural Biochemistry  
 Leroy S. Palmer, Ph.D., Professor of Agricultural Biochemistry  
 David R. Briggs, Ph.D., Associate Professor of Agricultural Biochemistry  
 W. Martin Sandstrom, Ph.D., Associate Professor of Agricultural Biochemistry

## AGRICULTURAL ECONOMICS

Oscar B. Jesness, Ph.D., Professor of Agricultural Economics and Chief of the  
 Division  
 George A. Pond, Ph.D., Professor of Agricultural Economics

## AGRONOMY AND PLANT GENETICS

Herbert K. Hayes, D.Sc., Professor of Agronomy and Plant Genetics and Chief  
 of the Division  
 Royse P. Murphy, M.S., Instructor in Agronomy and Plant Genetics

## ANIMAL AND POULTRY HUSBANDRY

Walter H. Peters, M.Agr., Professor of Animal Husbandry and Chief of the  
 Division  
 Alfred L. Harvey, M.S., Assistant Professor of Animal Husbandry

## DAIRY HUSBANDRY

Willes B. Combs, M.A., Professor of Dairy Husbandry

## FORESTRY

Henry Schmitz, Ph.D., Professor of Forestry and Chief of the Division  
 Edward G. Cheyney, B.A., Professor of Forestry

## HORTICULTURE

William H. Alderman, B.S.A., Professor of Horticulture and Chief of the Division  
 Wilfrid G. Brierley, Ph.D., Professor of Horticulture

## RHETORIC

Robert C. Lansing, M.A., Associate Professor of Rhetoric and Chief of the Division  
 Francis E. Drake, M.A., Instructor in Rhetoric  
 Ralph G. Nichols, M.A., Instructor in Rhetoric

## SOILS

Frederick J. Alway, Ph.D., Professor of Soil Chemistry and Chief of the Division  
Clayton O. Rost, Ph.D., Professor of Soils  
Paul R. McMiller, M.S., Assistant Professor of Soils

## MEDICAL SCHOOL

## BACTERIOLOGY AND IMMUNOLOGY

Winford P. Larson, M.D., Professor of Bacteriology and Immunology and Head  
of the Department  
Robert G. Green, M.A., M.D., Professor of Bacteriology and Immunology  
H. Orin Halvorson, Ch.E., Ph.D., Professor of Bacteriology and Immunology  
Arthur T. Henrici, M.D., Professor of Bacteriology and Immunology  
Charles E. Skinner, Ph.D., Assistant Professor of Bacteriology and Immunology

## PHYSIOLOGICAL CHEMISTRY

George O. Burr, Ph.D., Professor of Physiological Chemistry and Director of the  
Division  
Wallace D. Armstrong, Ph.D., M.D., Associate Professor of Physiological Chem-  
istry  
L. Earle Arnow, Ph.D., M.D., Assistant Professor of Physiological Chemistry  
Leo T. Samuels, Ph.D., Assistant Professor of Physiological Chemistry  
Richard H. Barnes, Ph.D., Instructor in Physiological Chemistry  
Olaf Mickelsen, Ph.D., Instructor in Physiological Chemistry

## SCHOOL OF BUSINESS ADMINISTRATION

Russell A. Stevenson, Ph.D., Dean of the School of Business Administration  
John J. Reighard, M.A., C.P.A., Assistant Dean of the School of Business Admin-  
istration  
George Filipetti, Ph.D., Professor of Economics and Business Administration and  
Adviser in Engineering Business Courses  
Roy G. Blakey, Ph.D., Professor of Economics  
Frederic B. Garver, Ph.D., Professor of Economics  
Ernest A. Heilman, Ph.D., Professor of Accounting  
Arthur W. Marget, Ph.D., Professor of Economics and Finance  
Bruce D. Mudgett, Ph.D., Professor of Economics and Statistics  
J. Warren Stehman, Ph.D., Professor of Economics and Finance  
Roland S. Vaile, M.A., Professor of Economics and Marketing  
Dale Yoder, Ph.D., Professor of Economics and Industrial Relations  
Arthur M. Borak, Ph.D., Associate Professor of Economics  
Richard L. Kozelka, Ph.D., Associate Professor of Economics and Statistics  
Harry J. Ostlund, B.A., Associate Professor of Accounting  
Emerson P. Schmidt, Ph.D., Associate Professor of Economics  
Arthur R. Upgren, Ph.D., Associate Professor of Economics and Finance  
Francis M. Boddy, Ph.D., Assistant Professor of Economics  
A. Hamilton Chute, Ph.D., Assistant Professor of Marketing

Alfred B. Cummins, J.D., M.S. in M.E., Assistant Professor of Economics and Business Administration  
 Walter R. Myers, Ph.D., Assistant Professor of Economics and Finance  
 George J. Stigler, Ph.D., Assistant Professor of Economics  
 Franklin D. Gray, B.A., B.C.L., Lecturer in Business Law  
 Ben W. Palmer, M.A., LL.B., Lecturer in Business Law  
 Victor G. Pickett, B.S., Lecturer in Economics  
 Marshman Wattson, B.A., LL.B., Lecturer in Business Law  
 Helen G. Canoyer, Ph.D., Instructor in Economics and Marketing  
 Richard K. Gaumnitz, M.A., Instructor in Statistics  
 Richard A. Graves, M.A., Instructor in Economics and Insurance  
 Reuel I. Lund, C.P.A., Ph.D., Instructor in Economics and Accounting  
 Herbert E. Miller, M.A., Instructor in Accounting  
 Edmund A. Nightingale, M.A., Instructor in Economics and Transportation

#### MILITARY SCIENCE AND TACTICS

Charles A. French, Colonel, Coast Artillery Corps, B.S., Professor of Military Science and Tactics  
 Kent Nelson, Colonel, Medical Corps, Retired, M.D., Assistant Professor of Military Science and Tactics  
 Harry L. King, Lieutenant Colonel, Coast Artillery Corps, Assistant Professor of Military Science and Tactics  
 Charles E. Calverley, Captain, Coast Artillery Corps, Ph.D., Assistant Professor of Military Science and Tactics  
 Carl A. Jacobson, Captain, Signal Corps, B.S.(E.E.), Assistant Professor of Military Science and Tactics  
 William C. Rindsland, 1st Lieutenant, Coast Artillery Corps, B.S.(C.E.), Assistant Professor of Military Science and Tactics  
 Eugene L. Hess, 1st Lieutenant, Coast Artillery Corps, B.Chem., Assistant Professor of Military Science and Tactics  
 Philip M. Schroeder, 1st Lieutenant, Coast Artillery Corps, B.S.(For.), Assistant Professor of Military Science and Tactics  
 Kenneth Cruse, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics  
 Carl Cihos, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics  
 Roger R. Roush, Sergeant, Detached Enlisted Men's List, B.S.(E.E.), Instructor in Military Science and Tactics  
 Roscoe R. Conklin, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

#### NAVAL SCIENCE AND TACTICS

Bayard H. Colyear, Commander, United States Navy, B.S., Associate Professor of Naval Science and Tactics  
 Everett E. Pettee, Lieutenant, United States Navy (Retired), M.A., Assistant Professor of Naval Science and Tactics

## PHYSICAL EDUCATION

## PHYSICAL EDUCATION FOR MEN

Frank McCormick, B.A., LL.B., Professor of Physical Education for Men and  
Director of Athletics

Bernard W. Bierman, B.A., Professor of Physical Education for Men and Head  
Football Coach

Louis F. Keller, M.A., Associate Professor of Physical Education for Men

Edwin L. Haislet, Ed.D., Assistant Professor of Physical Education for Men

David MacMillan, B.S., Assistant Professor of Physical Education for Men

Ralph A. Piper, M.A., Assistant Professor of Physical Education for Men

David C. Bartelma, M.A., Instructor in Physical Education for Men

Phil Brain, Instructor in Physical Education for Men

Clarence R. Osell, M.S., Instructor in Physical Education for Men

Niels Thorpe, B.S., Instructor in Physical Education for Men

## PHYSICAL EDUCATION FOR WOMEN

J. Anna Norris, M.D., Professor and Director of Physical Education for Women



## GENERAL INFORMATION

### INSTITUTE OF TECHNOLOGY

The Institute of Technology was established by action of the Board of Regents on October 19, 1935, to embrace the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy, effective November 1, 1935.

#### *College of Engineering and Architecture*

The College of Engineering and Architecture had its beginning in the College of Agriculture and the Mechanic Arts which was authorized by the legislative act of 1868. Courses in Civil and Mechanical Engineering were first offered in 1871. In the reorganization of the University, in 1872, the College of Mechanic Arts was established. It became the College of Engineering, Metallurgy, and the Mechanic Arts in 1892, the College of Engineering and the Mechanic Arts in 1897, and the College of Engineering and Architecture in 1916. A course in Electrical Engineering was first offered in 1887. Architecture was announced in 1912. In 1925, the name of the Department of Architecture was changed to the School of Architecture. The Agricultural Engineering course was offered in 1925, and the courses in Aeronautical Engineering in 1928. Combined courses with Business Administration were established in 1934.

The departments of this college occupy the following buildings on the Main campus: Main Engineering, Electrical Engineering, Mechanical Engineering, and the Experimental Engineering Laboratories. Portions of the School of Chemistry, Pillsbury Hall, and the Armory are also utilized. The Hydraulic Laboratory is situated at the St. Anthony Falls of the Mississippi River about a mile upstream from the campus. Agricultural Engineering has its own building on the Agricultural campus. The libraries of Engineering and Architecture are situated in the Main Engineering Building.

The purpose of this college is to give the students a broad foundation in the fundamental principles of engineering and architecture, together with sufficient knowledge of professional practice to enable them to apply those principles successfully. It is not possible in college to educate a fully trained engineer, as the application of the principles to the practice of engineering is to be learned through experience. There are certain subjects, such as surveying and drafting, in which some proficiency is required. This enables a student upon graduation to fill satisfactorily a subordinate position while obtaining a basis for growth and advancement.

It is intended that all of the technical courses given in this college shall be taught by men who have had practical experience in their respective fields in addition to their professional training.

The field of engineering is very broad and is continually becoming more extensive. From the technical lines of design, construction, maintenance, and operation of engineering works, which have always belonged to him, the trained engineer has been drawn into the business world to occupy positions of an executive character. To meet the demand for such service, the importance of the broader training in economic and commercial principles and industrial relations is recognized.

Withal, it is intended that the young graduate shall have obtained material assistance in developing those traits of character which will make him a loyal and exemplary citizen and a true gentleman.

*School of Chemistry*

The School of Chemistry was established in 1897 as a school of analytical and applied chemistry, subsidiary to the College of Science, Literature, and the Arts. In 1904 it was made a separate unit of the University, and in 1919, its present name was adopted, and its administration was correlated with that of the College of Engineering and Architecture under one dean.

The courses in Chemistry and Chemical Engineering were developed from the beginning of the school. The course in Physics was established in 1936.

The school occupies a large modern building, 180 by 200 feet, having six floors. Its laboratories are designed to afford facilities for instruction in the various branches of chemistry. The Chemistry library is well provided with complete sets of journals and compendia of chemical literature, among which are important sets not frequently found in university libraries. Many special laboratories for private research have been provided and ample facilities are available for graduate work leading to the higher degrees.

*School of Mines and Metallurgy*

The School of Mines and Metallurgy was established by the Board of Regents in 1888, upon recommendation of the general faculty of the University. A course in Mining and Metallurgy was announced in 1889. The school was affiliated with the College of Engineering, under the name of the College of Engineering, Metallurgy, and the Mechanic Arts, until 1897, when the School of Mines was made an independent college. In 1926 the name was changed to School of Mines and Metallurgy.

The school occupies the building provided by the Legislature of 1913. This building contains the library of the school together with the offices, classrooms, drafting rooms, and laboratories necessary to administer the courses in Mining, Metallurgy, Metallography, and Petroleum Engineering. For other fields of work necessary to the completion of well-rounded curricula advantage is taken of the instruction afforded by various departments in other units of the University.

The Mines Experiment Station was established by the Board of Regents in 1911. It occupies a specially constructed laboratory building of which a portion is assigned to the North Central Station of the United States Bureau of Mines.

The mining districts of Minnesota are within a few hours of Minneapolis by rail or paved road. The heartiest co-operation exists between the officials of the various mining companies and the school. As a result, the mining properties are at all times open to parties from the school for observation and study trips. Practical surveying, geological field work, and underground work are carried on in one or more of the districts.

Ample opportunity for field work in metallurgy is also available. Numerous fabrication and heat treating plants are located in the Twin Cities. Plants for the study of smelting and other processes can be reached with not more than an overnight trip by rail.

Students in the School of Mines and Metallurgy have, therefore, all the advantages afforded by a large university combined with ample opportunity for field observation and experience.

*Engineering Experiment Station*

The Engineering Experiment Station of the Institute of Technology provides facilities for graduate research and technical investigations in a variety of fields. The St. Anthony Falls Hydraulic Laboratory located on Hennepin Island, and

the Oak Street Laboratories on University Avenue are exceptionally well adapted to special large-scale investigations, many of which may be profitably conducted in co-operation with technical societies, associations, and industries. Several investigations of this type are now under way and provide an opportunity for advanced students in the institute to come in contact with industrial and technical problems. In many cases the projects provide graduate fellowships and part-time employment for advanced students.

#### COURSES AND DEGREES

The College of Engineering and Architecture offers four-year courses of study in Aeronautical, Agricultural, Civil, Electrical, and Mechanical Engineering, and a five-year course in Architecture. These courses lead to the degree of bachelor of aeronautical, agricultural, civil, electrical, or mechanical engineering, or architecture. In some of the courses, optional groups of electives are arranged for the guidance of students who desire to devote special attention to certain fields.

The Engineering Prebusiness course requires the first two years of work in this college. This is followed by two years in the School of Business Administration upon the completion of which the degree of bachelor of business administration is conferred.

In co-operation with the College of Science, Literature, and the Arts, a six-year course in Arts and Architecture is offered. It leads to the degrees of bachelor of arts, at the end of four years in the College of Science, Literature, and the Arts, and bachelor of architecture at the end of the sixth year in the Institute of Technology.

The School of Chemistry offers four-year courses in Chemistry, Chemical Engineering, and Physics, leading to the degree of bachelor of chemistry, bachelor of chemical engineering, or bachelor of physics, respectively.

Five-year combined courses in Engineering or Chemistry with Business Administration lead to two Bachelor's degrees, one in each of the two fields.

The School of Mines and Metallurgy offers four-year courses in Mining, Geological, Petroleum, and Metallurgical Engineering leading to the respective degrees of bachelor of mining engineering, B.Min.E.; bachelor of geological engineering, B.Geol.E.; bachelor of petroleum engineering, B.Pet.E.; and bachelor of metallurgical engineering, B.Met.E.

These colleges also offer work in the Graduate School leading to the Master's degree in the appropriate branch of engineering, in architecture, or in chemistry, or to the Doctor's degree.

The professional degree of aeronautical, agricultural, chemical, civil, electrical, geological, mechanical, metallurgical, mining, or petroleum engineer will be conferred upon those who have received the degree of bachelor of aeronautical, agricultural, chemical, civil, electrical, geological, mechanical, metallurgical, mining, or petroleum engineering, when they have completed the equivalent of one additional year's college work, four years of engineering experience in positions of responsibility, and have presented a satisfactory professional thesis.

Graduates of these colleges may be granted permission to pursue the year of graduate study *in absentia* under the direction of the faculty. It is recommended, however, that this year be spent in residence at this University and that the Master's degree be obtained in this manner. There are many advantages in taking this year immediately following graduation, thus making a five- or six-year course leading to the Master's degree in the corresponding branch of engineering or in architecture. Then after four years of approved experience and the preparation of the professional thesis, the Engineer degree may be obtained. This procedure

is especially recommended to those students whose undergraduate work is of high grade and who desire additional preparation for the higher positions which require strong character and leadership.

Candidates for the Engineer degrees register in the Graduate School.

#### ADMISSION

Detailed information concerning admission, entrance requirements, advanced standing, and expenses will be found in the Bulletin of General Information which will be sent to any address upon application to the registrar, University of Minnesota.

Students are admitted on certificate or by examination. In special cases, with the approval of the dean of the college, persons of mature age (twenty-four years or older) and experience may be admitted as adult special students to pursue specific courses of study.

**Admission by certificate.**—Applicants must present twelve units of work obtained in the last three years of high school (senior high school) of which at least nine must be included in Groups A, B, C, D, and E as listed below. These nine units must include a major or three units in one group and two minors of two units each in two other groups. Subject to these requirements, the applicant for admission to the Institute of Technology must include at least two units of English and two units of mathematics, including elementary algebra and plane geometry. One unit of mathematics and one unit of foreign language taken in the ninth grade may be counted in these groups. Applicants who stand in the upper 60 per cent of their high school class on the basis of their scholastic records, will be admitted directly; those in the lower 40 per cent will be given individual consideration and may be permitted to take special tests to qualify for admission. Chemistry is desirable for admission to the School of Chemistry.

Students who expect to enter the Institute of Technology are urged to include in their high school courses additional mathematics, beyond the two years required, especially higher algebra and solid geometry; Latin, two units; German or French, two units; chemistry, one unit; physics, one unit; ancient, modern, and American history; and American government or civics. French is desirable for students in architecture. German is important for students entering the School of Chemistry. French is also desirable for chemistry students who plan to enter the Graduate School.

Students who are able are advised to take as many courses in the College of Science, Literature, and the Arts as may be possible or desirable before entering the Institute of Technology or during the courses therein. If a bachelor of arts degree were taken first, enough of the required basic courses in science and mathematics could be included to shorten the subsequent Bachelor's course in the Institute of Technology to three years. Such broadening and cultural courses are becoming increasingly important in the training of engineers and scientists.

Applicants deficient in either or both higher algebra and solid geometry will be admitted provisionally at the beginning of the school year. In order to continue in the Institute of Technology these deficiencies must be removed during the fall quarter. Opportunities to remove the deficiencies will be offered within the institute in the fall quarter. Students with deficiencies in mathematics will be required to attend one Summer Session if they desire to graduate in four years. It is recommended that such deficiencies be made up in the Summer Session before entering the institute, thereby avoiding the complications incident to making them up during the freshman year.

**List of entrance subjects.**—Only those subjects included in the following groups may be counted toward admission.

The term *unit* means not less than five recitations of forty minutes each per week for a school year of thirty-six weeks. In laboratory, drawing, and other manual courses, twice this amount of class time is required for one unit.

- Group A English: 2 or 3 units.
- Group B Foreign languages: Latin, Greek, German, French, Spanish, Scandinavian, 1 to 4 units each.
- Group C History and social sciences: European history,  $\frac{1}{2}$  to 2 units; English and American history,  $\frac{1}{2}$  or 1 unit each; economics and sociology,  $\frac{1}{2}$  unit each; American government, commercial geography, and history of commerce,  $\frac{1}{2}$  or 1 unit each.
- Group D Mathematics: elementary algebra and plane geometry, 1 unit each; unified mathematics, 2 units; higher algebra,  $\frac{1}{2}$  or 1 unit; solid geometry and trigonometry,  $\frac{1}{2}$  unit each.
- Group E Natural sciences: biology, physics, and chemistry, 1 unit each; botany and zoology,  $\frac{1}{2}$  or 1 unit each; physiology, astronomy, and geology,  $\frac{1}{2}$  unit each.
- Group F Vocational and miscellaneous subjects: The three units which are not required to be in Groups A, B, C, D, E may be in work which the superintendent certifies as being of acceptable nature and as having been counted toward the applicant's graduation.

**Admission by examination.**—Applicants who are high school graduates or at least nineteen years of age may be admitted provisionally and subject to one year of satisfactory work, upon passing the following tests:

- a. College aptitude test
- b. Test of proficiency in English
- c. Test in mathematics including arithmetic, algebra, and geometry
- d. Test in chemistry, if entering School of Chemistry.

Applicants failing to pass test (b), (c), or (d) may apply for a subsequent examination at any scheduled date on payment of a fee of five dollars. Those failing to pass test (a) may enter only upon satisfactorily meeting the entrance requirements by the certificate method.

**Time of admission.**—The regular time to enter the institute is in September. However, students will be admitted at the beginning of the winter quarter in January. Such students must have entrance credits in higher algebra and solid geometry and should have credits in high school chemistry. Students cannot be admitted at the beginning of the spring quarter, since no beginning courses in mathematics, chemistry, English, or drawing are given in this quarter.

#### ADVANCED STANDING

Students who have pursued courses of study in other colleges of recognized standing may receive advanced credit under the rules of the University and of the institute. See Requirements for Graduation.

Students transferring from other accredited colleges to the Institute of Technology will receive credit in only those courses in which they present a grade of at least C.

A student entering the School of Chemistry as a sophomore (48-101 required credits) may transfer not more than one half of the total number of elective credits allowed for graduation; in the same manner a junior (102 or more required credits) will be permitted to transfer only three quarters of the total number of elective credits allowed for graduation.

## REGISTRATION

All undergraduate students are required to pay the prescribed fees to the university bursar at the beginning of each quarter. Necessary classification blanks showing the courses a student expects to pursue are to be filled out and filed either at the beginning of the fall quarter for the entire year or at the beginning of each quarter during the college year. Classification and enrolling of students registering in Aeronautical, Agricultural, Civil, Electrical, Mechanical, or Prebusiness Engineering and Architecture take place in the Main Engineering Building; for those registering in Chemistry, Chemical Engineering, and Physics in the Chemistry Building; and in Mining, Metallurgical, Geological, and Petroleum Engineering in the Mines Building.

All students entering the institute for the first time must send or present their credentials to the registrar of the University, who will notify each applicant in regard to his admission. Before registering, all new matriculants are required to take a physical examination, and the following tests:

1. Co-operative English test.
2. Impromptu English theme.

On the basis of his standing in these tests and his scholarship rank in preparatory school, a student will be classified in one of the two groups in English as follows:

1. Required to take English 4-5-6, nine (9) credits in composition.
2. Required to make up minimum essentials as a preliminary to English 4-5-6.

Any student who takes these tests when they are given in the high school and preparatory schools of the state and who applies for admission to the University before September 1 will be mailed a card showing his classification in English. Those who have not taken the tests will be required to take them on Friday or Saturday preceding the regularly scheduled Freshman Week. *No freshman will be allowed to register without presenting a card giving his assignment in English.*

Students should consult the university calendar in regard to registration dates.

Students will not be allowed to register for more than 19 credit hours without the approval of the Students' Work Committee.

A substitution for formal prerequisites for any course must be approved by the department concerned.

Freshmen are not permitted to take additional courses (except Military or Naval Science and Tactics) without permission of the Freshman Students' Work Committee.

No change in registration will be permitted later than 10 days after the beginning of the quarter. A late fee of \$2 is charged for changes in registration made after the second day of the quarter.

## FEES AND EXPENSES

The annual fee for students in this college, except aeronautical sophomores, juniors, and seniors, is \$90 for residents and \$135 for nonresidents. The annual fee for sophomores, juniors, and seniors in Aeronautical Engineering is \$105 for residents and \$150 for nonresidents. One third of the annual fee is due at the beginning of each quarter. Fellows, scholars, assistants, and instructors are not required to pay university fees or tuition when they are regularly enrolled in the Graduate School.

Tuition fee (per quarter):

All students except aeronautical sophomores, juniors, and seniors	
Residents of Minnesota .....	\$30.00
Nonresidents .....	45.00
Aeronautical sophomores, juniors, and seniors	
Residents of Minnesota .....	35.00
Nonresidents .....	50.00
Matriculation deposit‡ (first quarter only).....	10.00
Incidental fee, per quarter.....	8.90
Special fees:	
Examination for removal of condition .....	1.00
Examination for credit (after first six weeks in residence).....	5.00
Special examination .....	5.00
Chemistry deposits,‡‡ including laboratory fee of \$2 per quarter .....	10.00
Graduation fee .....	7.50

**Privilege fees.**—The fee for the privilege of late registration or late payment of fees is \$2 through the third day of classes, on the fourth day the fee is \$2.50 and then increases 50 cents per day to a maximum of \$5. The fee for late change of registration is \$2 beginning the third day of the quarter.

**Living expenses.**—Detailed statements regarding living expenses may be found in the Bulletin of General Information. For students not living at home, the approximate expense of a year in this college has been estimated at about \$500 minimum, \$800 average, and \$1,000 liberal, not including clothing, traveling, or vacations. The average estimate is based upon the following details:

Tuition and laboratory fees .....	\$135.00
Laundry .....	40.00
Room rent .....	120.00
Meals .....	270.00
Books and instruments .....	35.00
Incidentals .....	200.00
<hr/>	
Total .....	\$800.00

Aeronautical sophomores, juniors, and seniors should add \$15 for tuition. For nonresidents of Minnesota, \$45 should be added for tuition.

A great deal depends upon the frugality of the student. By reducing the amount spent for incidentals and by obtaining cheaper board and room many students will be able to live for less than the amount estimated above. Likewise other students will pay more for board, room, and incidentals and will not be able to live within these amounts. To live within the minimum amount, a student should expect to forego all luxuries and economize in every way possible.

When coming to the University for the first time, the student should have money enough to cover the full expense for at least the first quarter without depending upon outside employment for his support. After a term at the University, he will know more about the possibilities of supplementing his income by employment, especially as regards the spare time at his disposal for such work.

‡ Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University.

‡‡ The \$2 fee per quarter is taken from the chemistry deposit blue card which is purchased at the bursar's window in the registrar's office. No student can be assigned a desk in the laboratory until he presents his blue card.

## UNIT OF CREDIT

The standard unit of credit in the University is the quarter credit, or simply, the *credit*. It corresponds to one class period per week for one quarter. This class period may be a one-hour lecture or recitation, or a two- or three-hour class in laboratory, drawing, surveying, or computations, but in any case one credit is supposed to require three actual hours of the average student's time per week for one quarter. One hour of recitation is assumed to require two hours of preparation or study. A two-hour laboratory period may require one hour of home work to complete the credit. A three-hour period usually carries one credit without additional work outside of class. The credit allowed for a lecture may be from one-third to one hour depending upon the amount of outside work or study required in connection with it.

## CREDIT FOR OUTSIDE WORK

Credit for certain courses, as a result of work done outside of the regular classes, may be obtained by satisfactorily passing comprehensive examinations. This includes work done in extension classes, by correspondence study, by the aid of a private tutor, by individual study, through practical experience, or otherwise.

The comprehensive examination will be of such thoro and searching character as to determine whether the student has done all the work of the course. It should require at least three times the work of the usual final or condition examination and will be conducted by a committee appointed by the head of the department in which the course is given.

Permission to take the examination must be obtained from the Students' Work Committee, and the usual fee of \$5 for each special examination must be paid unless it be taken within six weeks after first entering the University.

## EXTENSION COURSES

Courses in engineering, architecture, and chemistry are offered by the General Extension Division of the University in evening classes and by correspondence study. Persons who are unable to attend the regular university courses may obtain valuable instruction in this manner.

Credits will be accepted from the Extension Division for the following types of courses:

1. Nontechnical courses taken in residence (residence as defined by the University Senate ruling).
2. Such other residence courses as have been approved by the department concerned of the Institute of Technology and by the dean, which courses shall have been designated as credit courses by the Extension Division.
3. Credits obtained by correspondence study courses in College Algebra, Trigonometry, and Analytical Geometry not to exceed a total of 15 credits, and in English and in other subjects not required in the student's curriculum not to exceed a total of 9 credits, will be accepted.

## ATTENDANCE

It is expected that all students will be regular in attendance at all class exercises and that they will do all the work of their courses. Neglect of work, as indicated by irregularity in attendance or low scholarship, will be sufficient reason for exclusion from class. Any student who has unexcused absences equal to the number of credits in a course, but in no case less than two, may be dropped from the class with a record of failure in the course.



## INSPECTION TRIPS

All seniors registered in Chemical Engineering are required to go on a trip of inspection and observation through certain large industrial plants. This trip is usually taken during the spring vacation and is under the personal supervision and guidance of members of the faculty. It includes plants in Milwaukee, Chicago, and near-by points. The expenses of the trip are minimized as far as possible, and must be defrayed by the individual student. They amount to from \$75 to \$100 per student.

Seniors in Aeronautical Engineering are required to take an inspection trip during the spring vacation to visit aeronautical manufacturing, operating, and research establishments in the central and eastern portions of the United States. The expense to each student is estimated at about \$75.

In Mines and Metallurgy, field trips are required at the end of the sophomore and junior years. The sophomore trip embraces mine surveying on the iron ranges in northern Minnesota for four weeks beginning about June 15, the expense amounts to about \$60. Field work in geologic mapping is also required. The junior mining and nonferrous metallurgy, and petroleum trips cover a study of mine plants and operations in leading mining or oil fields in the western part of the country for nearly three weeks beginning about September 1. Reports on the junior field trips of the School of Mines and Metallurgy must be prepared under the direct supervision of the department concerned, beginning the first day of the fall quarter and continuing for a period of two weeks. A limited program will be carried in addition to work on the field report. Final reports must be typewritten and contain drawings, to scale, made from the field sketches, covering operations, and details of plants and equipment. These reports shall become the property of the school. Class work in the remaining subjects of the first quarter, senior year, will begin when the field work reports are accepted. The expense amounts to approximately \$125. The junior geology trip embraces standard types of geological field work in the Black Hills region. The expense amounts to about \$100. The junior ferrous metallurgy trip includes inspection and reports from iron and steel plants, fabrication plants, and heat treating plants in the Middle West. The expense amounts to approximately \$100.

An inspection trip for electrical engineers, carrying two credits, and under faculty supervision is a required part of the senior curriculum. Industrial plants in Minnesota and neighboring states are visited. The trip is taken during the spring vacation. Costs are borne individually by the student. Expense is estimated at about \$40.

Seniors in Mechanical Engineering are required to take an inspection trip during the spring vacation to various industrial plants to study mechanical equipment, manufacturing methods and processes. The expense to each student is estimated at about \$40.

## REQUIREMENTS FOR GRADUATION

To be recommended for the degree of bachelor of aeronautical, civil, electrical, or mechanical engineering, chemistry or physics, the student must satisfactorily complete all of the courses prescribed in the corresponding curriculum together with sufficient electives to make a total of at least 207 credits. In the five-year course in Architecture, 225 credits are required for graduation. In Agricultural Engineering 210 credits are required for graduation. For the degree of bachelor of interior architecture, the requirements are 192 credits, including all required courses, plus 90 honor points from the first two years. For the degree of bachelor of chemi-

cal engineering, 218 credits are required. For the degree of bachelor of business administration in combination with engineering or chemistry, a student must complete the requirements for the Bachelor's degree in one of the engineering or chemistry curricula and include the 74 prescribed credits in business subjects. In Mining and Petroleum Engineering a total of 235 credits must be completed. Metallurgical Engineering requires 222 credits and Geological Engineering, 233 credits.

Students entering with advanced standing from other colleges or universities must spend at least one year in residence here before they will be recommended for graduation. If the term of residence is only one year it must be the senior year; and in any case such a student must spend two "quarters" of his senior year in residence.

*College of Engineering and Architecture*  
*School of Mines and Metallurgy*

Every student entering the College of Engineering and Architecture or School of Mines and Metallurgy on or after the fall of 1940 will be required to have a *cumulative honor point average* of at least 1.00 in order to be eligible for a degree.

In calculating the cumulative honor point average for a student at any given time the honor points of *all* his past work are first added and this sum is then divided by the sum of all the credits for which final grades have been given during this time. All required courses for which a grade of F has been received must be repeated. If a grade of D has been received, they may be repeated at the option of the student. Elective courses for which a grade of D or F has been received may also be repeated.

If at the end of any year a student stands below the cumulative honor point requirement, he may petition to make up the deficiency by repeating the courses in which he has received an F, or in the case of elective courses, the deficiency may be made up by substituting additional courses. If the student is in his third year these additional courses must be of a technical and professional nature. In any case of additional courses being taken, the student, whose cumulative honor points are below the requirements, must obtain the written approval of his choice from the head of the department in which he is registered. Such application shall be made in triplicate on blanks provided by the departmental office.

Transfer students coming from other colleges or universities will be subject to the cumulative honor point requirements in order to enter the College of Engineering and Architecture or the School of Mines and Metallurgy. Honor points obtained in other institutions are used only for this computation. Once these transfer students have entered the College of Engineering and Architecture or the School of Mines and Metallurgy, their qualifications for continuing in the college are computed solely from the honor points earned in the college.

Honor point averages are calculated in June, at the end of each school year. Any honor points earned during summer sessions are included in the cumulative figures of the following year. Each student is advised to calculate his own cumulative honor point average at the end of each quarter in order to know where he stands. This is particularly necessary at the close of the spring quarter so that the student may know quickly whether or not he will be permitted to continue his study in the regular manner.

Each student is responsible for ascertaining his honor point average at the end of every quarter. Any student who has not completed all of his required freshman courses must report to Professor M. C. Sneed if his cumulative honor point average at the end of any quarter falls below the requirements. All other

students must report to Professor R. W. French if their cumulative honor point averages at the end of any quarter fall below the requirements.

A student is removed from probation at the end of a quarter or a Summer Session if his cumulative honor point average is again above the probation level.

A student on probation for two successive quarters is not permitted to register for the third quarter unless his cumulative honor point average is above the probation level. Such a student desiring to re-enter may do so but he must wait until the beginning of the quarter corresponding to the quarter in which he was first on probation. A student under this rule is readmitted on probation and if he continues to do work below the minimum requirements he will be suspended for not less than two quarters.

Students suspended for low scholarship must receive permission from the Students' Work Committee before they may re-register.

A student on probation must register for a minimum of 10 credit hours per quarter or 5 credits per Summer Session.

#### *School of Chemistry*

1. Students registered in the School of Chemistry shall be assigned honor points on the completion of any course.

2. As a requirement for graduation, a student must obtain at least one honor point per credit in each quarter of the prescribed courses of the freshman and sophomore years in inorganic chemistry and qualitative analysis, and an *average* of one honor point per credit in Analytical Chemistry 1-2. The satisfying of this requirement in any quarter of the courses in inorganic chemistry and qualitative analysis is a prerequisite to registration for the work of any succeeding quarter. A student who fails to satisfy this requirement in any course must repeat the course in class the next time the course is offered.

3. As a requirement for graduation a student must obtain an average of at least one honor point per credit for his total work in courses which do not belong to his freshman or sophomore years.

#### EXCESS HONOR POINTS AND QUALITY CREDITS

4. The term "excess honor points," for any course is defined as the total number of honor points received by a student for that course minus the number of honor points associated with a grade of C.

5. For every course in which a student obtains a grade above C he shall receive not only the stated credits for the course but in addition quality credits equal to the excess honor points divided by the factor ten. These quality credits are to be accepted on the same basis as the nominal or stated credits in satisfying the credit requirement for graduation.

#### SPECIAL REGULATIONS FOR STUDENTS PROCEEDING TO THE DEGREE OF BACHELOR OF CHEMISTRY

6. Students who at the end of the junior year have an honor point average of less than 1.9 in all courses taken while registered in the school will pursue in their senior year the prescribed curriculum and will be eligible for graduation when their total credits (stated plus quality) amount to the required number, namely 207. Students with an honor point average *close to 1.9* should be able, in the spring quarter of their senior year, to register in the Graduate School and obtain *some* residence and graduate credit.

7. A student who at the end of the junior year has an honor point average of more than 1.9 in all courses taken while registered in the school will pursue in his senior year *a course of study prescribed for him* by an adviser after thoro study by the adviser of the needs, qualifications, and desires of the student. Toward the end of his junior year or at the beginning of his senior year, the student shall select an adviser from among the chiefs of the divisions of the school. An adviser so selected may delegate his duties in this connection to a member of his staff.

8. As soon as the senior student, following the course of study prescribed by his adviser, has accumulated a total of 207 quarter credits (stated plus quality) he shall be eligible to be recommended for the Bachelor's degree.

#### SPECIAL REGULATIONS FOR STUDENTS PROCEEDING TO THE DEGREE OF BACHELOR OF CHEMICAL ENGINEERING

9. Students in the Chemical Engineering Curriculum will be recommended for graduation when they have *completed the prescribed courses*, have satisfied the requirements of paragraphs (2) and (3) and have accumulated at least 218 quarter credits (stated plus quality). Students whose honor point average at the end of the junior year *does not greatly exceed unity* will register in the senior year for the prescribed courses and usual electives. Students with an honor point average *considerably greater than unity* will consult with the chief of the Department of Chemical Engineering or with an adviser assigned by him, who will *prescribe the work* to be undertaken in the senior year. In exceptional cases, the adviser is authorized to *wave the requirement* that any given courses are prerequisite to graduation. In any case, gifted students will be able in the spring quarter of their senior year to obtain credit in the Graduate School for an appreciable fraction of the work of that quarter.

#### SPECIAL REGULATIONS FOR STUDENTS PROCEEDING TO THE DEGREE OF BACHELOR OF PHYSICS

10. As soon as the senior student, following the course of study prescribed by his adviser, has accumulated a total of 207 quarter credits (stated plus quality) he shall be eligible to be recommended for the Bachelor's degree.

#### STUDENTS ENTERING WITH ADVANCED STANDING

11. The above regulations shall apply to students entering with advanced standing as far as the work taken by them after entering the University of Minnesota is concerned. Honor point averages and quality credits will be computed from grades received in courses taken at the University of Minnesota.

#### SCHOLARSHIPS AND PRIZES

**Research fellowships.**—In the Engineering Experiment Station research fellowships are available from time to time which are open to engineering graduates, including chemical engineers. The holder is required to give twenty hours per week, that is, about half of his time, to such research service as may be assigned him. In addition he is expected to carry half-time work in the Graduate School toward an advanced degree.

**Teaching fellowships** in civil and electrical engineering are open to graduates in these fields. Each fellow renders part-time service in instruction while pursuing graduate study.

**The Shevlin Fellowship in Chemistry.**—The Shevlin Fellowship in Chemistry, established by the late Thomas H. Shevlin, of Minneapolis, is awarded annually and yields \$500. Candidates for this fellowship should file their applications before March 1 with the dean of the Graduate School. The Shevlin fellow devotes his entire time to graduate work and is not required to render any service to the University.

**The du Pont Fellowship in Chemistry.**—This fellowship was founded by E. I. du Pont de Nemours and Company, Wilmington, Delaware, and yields \$750 annually. The holder devotes his entire time to graduate work and is not required to render any service to the University. Applications for this fellowship should be submitted to the dean of the Institute of Technology before March 15.

**The Hormel Fellowships in Chemical Engineering and Organic Chemistry.**—In the establishment of the Hormel Foundation at the University of Minnesota by the Hormel Company of Austin, Minnesota, provision was made for two fellowships of \$750 each in the School of Chemistry. The holder devotes his entire time to graduate work and is not required to render any service to the University. Applications for this fellowship should be submitted to the dean of the Institute of Technology before March 15.

**The Superior Metal Products Research Fellowship in Metallurgy.**—This fellowship is awarded to a qualified graduate student devoting half time to research on tin plate and the remainder to graduate work. It yields \$600 annually. Candidates should file application before March 15 with the dean of the Institute of Technology.

**Fellowships in public administration.**—The University of Minnesota awards annually a limited number of *pre-service fellowships in public administration* to college and university graduates without previous experience in government service. These fellowships carry stipends of \$650 plus an additional amount sufficient to pay tuition and fees in the Graduate School. Holders of these fellowships devote their entire time to graduate study. They are open to graduates of professional and technical schools, preference being given to applicants who have had preparation in political science and related social sciences. Upon the satisfactory completion of a year of resident study, the fellowship will be renewed for a second year to provide internship training with some governmental agency in the particular field of government service in which the student is especially interested.

The University also offers several *in-service fellowships in public administration* to college and university graduates who are employed in government service and who have been in such service for at least three years. The stipends for these fellowships vary from \$1,000 to \$1,500. The period of training includes the three quarters of the regular academic year and the first term of the Summer Session. Persons holding professional and technical positions in national, state, and local governments are eligible to apply. Preference is given to those who have had at least some preparation in political science and related social sciences.

**Assistants.**—The School of Chemistry employs 42 graduate assistants at from \$500 to \$600 per year, on part time. They devote from eight to twelve hours per week to instruction and other assigned work, thereby obtaining valuable experience in laboratory teaching under competent direction. In addition to these duties, each assistant is expected to pursue graduate work toward a higher degree. Application should be made to the dean of the Institute of Technology.

**Prizes.**—Various prizes in the University are open to students in these colleges. A list of them is given in the bulletin, *University Aids for Student Expenses*. Certain prizes are awarded to students in Engineering only, such as the

prizes of the Northwestern section of the American Society of Civil Engineers and the Twin Cities section of the American Society of Mechanical Engineers. The Tau Beta Pi, Chi Epsilon, Eta Kappa Nu, and Pi Tau Sigma, honorary engineering fraternities, also offer prizes.

Two prizes are open to sophomores in Chemistry and Chemical Engineering. These have been established by Phi Lambda Upsilon, honorary chemical fraternity, and the Twin City Alumni Association of Alpha Chi Sigma, chemical fraternity. The chemistry faculty offers a prize to seniors.

Prizes and medals are open to students registered in the School of Architecture. Medals are offered by the American Institute of Architects, Alpha Rho Chi, and the Scarab Fraternity. Prizes have been established, respectively, by the Alpha Alpha Gamma Sorority, the Gargoyle Club, and the Northern States Power Company.

**Loan funds.**—Various loan funds are available from which worthy students may obtain financial assistance after they have been in attendance a sufficient length of time to establish satisfactory records of accomplishment. Application should be made to the dean of student affairs and to the head of the student's department.

#### RESERVE OFFICERS TRAINING CORPS

##### *Army*

The War Department has established at this University units of medical, coast artillery (anti-aircraft), and signal corps, in which both basic and advanced courses are given. The coast artillery and signal corps units are made up almost entirely of students in the Institute of Technology for whom this technical and military training is particularly valuable. The Basic Course is open to all physically fit male students and carries one credit per quarter for six quarters; the Advanced Course is open to selected students who have completed the Basic Course.

Students in the institute who are admitted to the Advanced Course of the signal or coast artillery corps under the prescribed regulations receive for this work fifteen and eighteen elective credits toward graduation, respectively. They receive an allowance of cash and clothing from the government during the two years of the course, pay and transportation to attend one summer training camp and, if successful, a commission in the Officers' Reserve Corps of the United States Army after graduation.

Besides receiving technical instruction, the student in the Advanced Course has the opportunity to develop and exercise leadership and discipline which will be of value to him in his professional career. Special arrangements may be made in the student's program to enable him to take this course, the advantages of which are recognized.

##### *Navy*

The Naval Reserve Officers Training Corps of the University of Minnesota provides a four-year course for selected, physically qualified male students. A student who completes this course is eligible for a commission as ensign, United States Naval Reserve, or, as second lieutenant, United States Marine Corps Reserve, provided he applies for the commission, obtains a degree from the University, is recommended by the professor of naval science and tactics, and passes the prescribed physical examination. If the graduate is commissioned as ensign, U.S.N.R., he may, upon graduation, apply for one year of active duty at sea, upon completion of which he may be permitted to take an examination for a commission as an

ensign in the regular line of the Navy, provided he is recommended by his commanding officer and is less than twenty-six years of age on June 30 of that year.

Cruises on board battleships, cruisers, and destroyers are held in the Atlantic and Pacific during the summer months of each year. As a prerequisite to a commission, a cruise is required of all students upon the completion of the third year of the course, but all Naval R.O.T.C. students are eligible for a cruise each summer.

All prospective candidates for the Naval R.O.T.C. *must* apply in person to the professor of naval science and tactics, University of Minnesota, before registering for the course, as enrolments are limited by law and a prescribed physical examination must be taken before the candidate can be considered.

#### SELF-SUPPORT AND OUTSIDE ACTIVITIES

A large number of students contribute to their financial support by means of part-time work during the college year. Frequently such students undertake too much. They are advised to carry a lighter program of studies and to plan to spend more than four years in the college course if outside work requires a large amount of their time. Information regarding work for self-support during the college course may be obtained from the University Employment Service or the University Young Men's Christian Association.

Freshmen, in particular, are advised that the work of the first year in the institute will require their closest attention and application if they are to succeed. They should refrain from participation in unnecessary outside activities, while bearing in mind the importance of physical as well as mental development.

#### CHANGES IN BULLETIN

The faculties of the Institute of Technology reserve the right to change their curricula and to cancel or change without notice any course printed in this bulletin. The bulletin is a statement of present conditions, and is subject to modification in any particular by faculty action.

#### SOCIETIES

Branches of the following national professional societies are maintained at the University of Minnesota by students and faculty members: American Chemical Society, American Institute of Chemical Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society of Agricultural Engineers, and the Institute of the Aeronautical Sciences. In addition there are the Architectural Society, the School of Mines and Metallurgy Society, and the University of Minnesota Flying Club.

## CURRICULA

### COLLEGE OF ENGINEERING AND ARCHITECTURE

Aeronautical Engineering	Electrical Engineering
Agricultural Engineering	Engineering and Business Administration
Architecture	Engineering Prebusiness
Interior Architecture*	Mechanical Engineering
Civil Engineering	

### SCHOOL OF CHEMISTRY

Chemistry	Physics
Chemical Engineering	

### SCHOOL OF MINES AND METALLURGY

Mining Engineering	Geological Engineering
Metallurgical Engineering	Petroleum Engineering

### STUDENTS ENTERING WITHOUT CHEMISTRY, HIGHER ALGEBRA, OR SOLID GEOMETRY AND THOSE REQUIRED TO TAKE THE COURSE IN SUBFRESHMAN ENGLISH COMPOSITION

Applicants deficient in either or both higher algebra and solid geometry, will be admitted provisionally at the beginning of the school year. Students entering without high school chemistry will be required to carry a special course in college chemistry during their freshman year. Students entering with deficiencies in higher algebra or solid geometry or both and all students required to take the course in Preparatory English must register for such deficiencies in the fall quarter. In order to continue in the Institute of Technology these deficiencies must be removed during the fall quarter. Applicants deficient in either higher algebra or solid geometry will not be admitted at the beginning of the winter or spring quarter.

If students who enter with deficiencies in mathematics desire to graduate in four years, it will be necessary to attend the Summer Session immediately following their freshman year. It is recommended that such deficiencies be made up in the Summer Session before entering the institute.

**Chemistry.**—Students entering the engineering divisions of the College of Engineering and Architecture and the School of Mines and Metallurgy who have not had high school chemistry will take Inorganic Chemistry 14f-15w, four credits per quarter, instead of Inorganic Chemistry 4f-5w. Those entering the School of Chemistry who have not had high school chemistry will take Inorganic Chemistry 6f-7w-12s, five credits per quarter, instead of Inorganic Chemistry 9f-10w-12s.

**Higher algebra.**—Freshmen entering without higher algebra will take Course 9 (Higher Algebra) without credit, and all students except architects who have had higher algebra will register for Course 11 (College Algebra). For all students except architects, Course 9 will be followed by Courses 11, 12, and 13 during the winter and spring quarters and the following Summer Session, respectively. Architectural students take Courses 3 and 4 during the winter and spring quarters.

During Freshman Week all entering freshmen will be given a placement

\* Discontinued. Not open to students entering after 1939-40.



examination in algebra. Students who do not show satisfactory results in this examination will be advised to register in Higher Algebra, M.&M. 9.

**Solid geometry.**—Students who do not offer solid geometry for entrance will take Drawing 10 (Solid Geometry) during the fall quarter and without university credit. Students in the engineering courses in the College of Engineering and Architecture should follow this by Drawing 1, 2, and 3 in the winter and spring quarters and the Summer Session, respectively; in the School of Chemistry, by Drawing 7 and 8 in the winter and Summer Session; and in the School of Mines and Metallurgy, by Drawing 7, three credits, in the winter, and Drawing 9, three credits, in the spring quarter. Students in architecture will add solid geometry to their fall quarter program.

**English.**—Students who are required to take the course in Preparatory English will take this course during the fall quarter without university credit. The required courses in Composition, English 4-5-6, should follow in the winter and spring quarters and the Summer Session, respectively. Students register in Preparatory English in the Extension Division. Fee \$7.50.

## AERONAUTICAL, AGRICULTURAL, CIVIL, ELECTRICAL, AND MECHANICAL ENGINEERING, AND PREBUSINESS

### FRESHMAN YEAR§

(For students entering with chemistry, higher algebra, and solid geometry and who pass their English tests.)

Course No.	Title	Credits	Rec.	Lect.	Lab.
<i>Fall Quarter</i>					
M.&M. 11	College Algebra .....	5	5	.....	.....
Inorg. Chem. 4	General Inorganic Chemistry .....	4	1	3	3
Encl. 4	Composition .....	3	3	.....	.....
Draw. 1	Engineering Drawing .....	3	.....	.....	8
M.E. 11*	Metal Working (for Prebusiness) .....	2	.....	2	3
G.E. 11	Orientation .....	0	.....	1	.....
<i>Winter Quarter</i>					
M.&M. 12	Trigonometry .....	5	5	.....	.....
Inorg. Chem. 5	General Inorganic Chemistry .....	4	1	3	3
Encl. 5	Composition .....	3	3	.....	.....
Draw. 2	Engineering Drawing .....	3	.....	.....	8
M.E. 9*	Foundry Practice (for Prebusiness) .....	2	.....	2	3
G.E. 12	Orientation .....	0	.....	1	.....
<i>Spring Quarter</i>					
M.&M. 13	Analytical Geometry .....	5	5	.....	.....
Inorg. Chem. 16	Semimicro Qualitative Analysis .....	5	.....	3	6
Encl. 6	Composition .....	3	3	.....	.....
Draw. 3	Descriptive Geometry .....	3	.....	.....	8
M.E. 4*	General Woodwork (for Prebusiness) .....	2	.....	2	3
G.E. 13†	Orientation .....	0	.....	1	.....

\* Freshmen in Engineering Prebusiness are required to take Shop Practice, M.E. 4, 9, and 11, 2 credits per quarter; not required of the others.

† Women take one of the following courses in place of G.E. 13, Phys.Ed. 1f, 2w, 3s, 4f, 5w, or 6s.

§ See statement on page 32.

## AERONAUTICAL ENGINEERING

Four-year course leading to the degree of bachelor of aeronautical engineering, B.Aero.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The course in Aeronautical Engineering is intended to provide instruction and training for students who wish to enter this field of engineering as a profession. With the rapid development of aviation in recent years, aeronautical engineering has assumed a prominent and important position among the engineering professions. The production of airplanes in the United States is increasing at a rapid rate. Attention is given to lighter-than-air craft. Extensive optional courses are available for those who wish to specialize in meteorology. Aeronautical engineers are required in all stages of the process, from the research work preliminary to improvements in design to the actual construction, testing, operation, and maintenance. Students trained in aerodynamics and the designing of light structures have been in demand in recent years in many industries.

The aeronautical engineering course is similar to other professional engineering courses. The first year of the course is the same as that of agricultural, civil, electrical, and mechanical engineering. The fundamental studies are the same. As a result, the graduates in aeronautical engineering should be prepared to enter various branches of the engineering field if, for any reason, they should prefer to do so.

As in other technical courses, so in aeronautical engineering, mathematics plays an important part. No student should enter this course who feels poorly prepared in mathematics.

It should be understood that this is a professional engineering course and not a training course for airplane pilots. It deals with the preparation of students for research, design, construction, operation, management, and maintenance of aircraft from the standpoint of the engineer or manager. However, practical flight training is important for aeronautical engineers, and students are urged to take advantage of their opportunities to obtain it through the University of Minnesota Flying Club, Army Air Corps, National Guard, Naval Reserve, Civil Aeronautics Authority's Flight Training Program, or private organizations.

Students taking the five-year combined course in Aeronautical Engineering and Business Administration may substitute business courses for Aero.E. 160, C.E. 17, Met. 152, and M.E. 151 or M.E. 154.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
Draw. 28†	Drafting .....	2	.....	.....	6
Aero.E. 3	Aeronautics .....	3	3	.....	.....
M.E. 5*	Pattern Practice .....	2	.....	2	3
or					
M.E. 13*	Forging and Welding .....	2	.....	2	3
or					
C.E. 17*	Surveying .....	3	.....	1	7
M.E. 70	Mechanical Technology .....	1	.....	2	.....

\* M.E. 5, 13 and C.E. 17 must be taken during sophomore year.

† For permissible substitute, see page 87.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
Aero.E. 2	Aircraft and Auto Engines .....	3	1	2	2
M.E. 5†	Pattern Practice .....	2	.....	2	3
or					
M.E. 13†	Forging and Welding .....	2	.....	2	3

*Spring Quarter*

M.&M. 26	Technical Mechanics: Statistics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
Aero.E. 1	Aeronautics .....	3	3	.....	.....
C.E. 17†	Surveying .....	3	.....	1	7
or					
M.E. 5†	Pattern Practice .....	2	.....	2	3
Draw. 29	Drafting .....	2	.....	.....	6

## JUNIOR YEARS

*Fall Quarter*

M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
Aero.E. 100	Aerodynamics .....	3	3	.....	.....
M.E. 18**	Machine Shop Practice .....	2	.....	2	3
M.E. 32	Elementary Mechanical Laboratory .....	2	.....	.....	4
M.E. 131	Thermodynamics .....	3	3	.....	.....
	Electives*				

*Winter Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Testing Laboratory .....	2	.....	1	2
Aero.E. 101	Aerodynamics .....	3	3	.....	.....
M.E. 26	Mechanism and Kinematics .....	3	3	.....	.....
M.E. 132	Thermodynamics .....	3	3	.....	2
	Electives*				

*Spring Quarter*

M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
Aero.E. 83	Stresses in Simple Structures .....	3	3	.....	.....
Aero.E. 102	Aerodynamics .....	3	3	.....	.....
Aero.E. 140	Aeronautical Laboratory .....	2	.....	.....	6
Aero.E. 170	Air Transport .....	2	2	.....	.....
M.E. 27	Machine Design .....	3	.....	2	3

## SENIOR YEARS

*Fall Quarter*

E.E. 46	Electric Power .....	3	3	.....	.....
M.E. 150	Internal Combustion Engines .....	3	3	.....	.....
Met. 152	Metallography .....	3	.....	2	2
Aero.E. 115‡	Airplane Stresses .....	3	2	.....	2
or					
M.&M. 180w	Advanced Strength of Materials .....	3	3	.....	.....
Aero.E. 120	Airplane Design .....	3	2	.....	3

\* For list of elective courses in other colleges, see page 88.

† M.E. 5, 13, and C.E. 17 must be taken during sophomore year.

‡ Students who contemplate an extra quarter in residence should arrange their programs for this time from such courses as Aero.E. 159, 160, 164, 165, 170, 173, 174, 175, 190, 191, 193, 194, 195, in order to have the proper sequence of courses.

§ Students may substitute M.&M. 180w, Advanced Strength of Materials, 3 cred., for Aero.E. 115f.

\*\* M.E. 18 may be taken in either the fall or winter quarter.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
E.E. 47	Electric Power .....	3	2	.....	2
M.E. 151†	Advanced Internal Combustion Engines.....	3	3	.....	.....
M.E. 154†	Design of Airplane Engines.....	2	.....	.....	6
Aero.E. 121	Airplane Design .....	4	2	.....	6
Aero.E. 141	Aerodynamics Laboratory .....	3	1	.....	6
Aero.E. 190	Seminar .....	1	1	.....	.....
	Electives*				

*Spring Quarter*

M.E. 158	Aero Engine Testing .....	2	.....	.....	6
Aero.E. 122	Airplane Design .....	3	1	.....	6
Aero.E. 155	Aeronautical Calculation .....	2	2	.....	.....
Aero.E. 159	Inspection Trip (spring vacation).....	1	.....	.....	.....
Aero.E. 160†	Airships .....	3	2	.....	3
Aero.E. 191	Seminar .....	1	1	.....	.....
	Electives*				

## AGRICULTURAL ENGINEERING

Four-year course leading to the degree of bachelor of agricultural engineering, B.Ag.E., in co-operation with the College of Agriculture, Forestry, and Home Economics.

Requirements for graduation include all prescribed courses with sufficient approved electives to make a total of at least 207 credits. This is an average of  $17\frac{1}{4}$  credits per quarter for 12 quarters.

Agricultural engineering activities are usually grouped under the heads of *farm power and machinery*, *farm structures*, and *land reclamation*. There is also need for service in the entire field necessitating general preparation in all three lines.

The farm machinery field covers the selection and management of machinery and equipment best suited to produce good results locally on any given type of farm, the design and construction of such machinery or equipment where it does not yet exist, the improvement of such design to meet special needs, and the adaptation of available types of power to local farm conditions. The farm structures field covers arrangement of the structures on the farmstead for economy, convenience, and comfort, the design and construction of farm buildings and related structures, and the adaptation of available types of structural materials to local farm conditions. The land reclamation field covers development of virgin lands suited to agriculture and the improvement of lands already under cultivation through economical clearing operations, and soil conditioning through efficient design and proper installation of drainage and irrigation works and control of soil erosion.

The field, as yet comparatively new and uncrowded, offers many opportunities among which the following are prominent: with manufacturers of farm machinery, equipment, and building materials; as executives, research engineers, publicity and sales managers, and technical field experts; as managers of large farms requiring extensive machinery or equipment; as reclamation engineers with the local, state, and federal government, and with development companies; as agricultural advisers with power companies in development of rural service; as agricultural engineering

\* For list of elective courses in other colleges, see page 88.

† Any one or two of the following courses: Aero.E. 160, Airships, and M.E. 151, Advanced Internal Combustion Engines, or M.E. 154, Design of Airplane Engines, but not *both* of these M.E. courses, may be replaced by an equal number of approved elective credits in any of the following fields: aerodynamics, airplane design and stresses, internal combustion engines, and air transport and meteorology; also in business for students taking the five-year combined course with business administration.

editors for farm papers and trade journals; as rural architects and builders; as teachers, investigators, and extension specialists in state agricultural colleges, experiment stations, and in the United States Department of Agriculture; as consulting agricultural engineers in general practice.

Students taking the combined five-year course in agricultural engineering and business administration may fill all junior and senior elective opportunities in the junior and senior years with required business courses under the direction of the agricultural engineering adviser and with the approval of the School of Business Administration.

For freshman year, see page 33.

SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
Ag.E. 5	Farm Structures Laboratory .....	3	.....	2	4
Ag.E. 43	Mechanical Laboratory .....	3	.....	1	5
Econ. 8	General Economics .....	3	3	.....	.....

*Winter Quarter*

M. & M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
Soils 9	Soils .....	4	4	.....	.....
Econ. 9	General Economics .....	3	3	.....	.....

*Spring Quarter*

M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
Ag.E. 21	Elements of Surveying .....	4	.....	1	9
Ag.E. 18	Agricultural Automotives .....	4	.....	2	6

JUNIOR YEAR

*Fall Quarter*

M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
Ag.E. 52	Elements of Farm Machinery .....	3	1	1	3
Geol. 5	Engineering Geology .....	3	.....	3	.....
M.E. 131	Thermodynamics .....	3	3	.....	.....

*Winter Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
Ag.Econ. 102	Farm Management: Organization .....	3	.....	3	.....
Ag.E. 51† or	Land Reclamation .....	5	1	4	.....
Soils 108	Physical Properties of Soils .....	3	.....	1	6
M.E. 26	Mechanism and Kinematics .....	3	3	.....	.....
Rhet. 22	Public Speaking .....	3	3	.....	.....

† Given only in alternate years, 1941-42, 1943-44, etc.

## INSTITUTE OF TECHNOLOGY

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Agron. 1	General Farm Crops .....	3	3	.....	.....
Ag.E. 37	Rural Sanitation .....	3	.....	3	.....
Ag.F. 53	Farm Structures .....	3	1	1	4
Ag.E. 72† or	Applied Electricity .....	3	.....	2	4
Ag.E. 73*	Steam Boilers and Heat Engines.....	3	1	1	4
C.E. 37	Structural Engineering .....	3	.....	2	4
M.E. 27	Machine Design .....	3	.....	2	3

## SENIOR YEAR

*Fall Quarter*

Ag.E. 67	Advanced Farm Structures Design.....	3	1	1	4
Ag.E. 71	Design and Economics of Agricultural Ma- chinery .....	3	.....	1	4
Dy.Husb. 1	Elements of Dairying .....	3	.....	3	.....
	Electives to complete program.				

*Winter Quarter*

Ag.E. 51† or	Land Reclamation .....	5	1	4	.....
Soils 108	Physical Properties of Soils .....	3	.....	1	6
G.E. 101	Contracts and Specifications .....	3	.....	3	.....
An.Husb. 1	Livestock Production .....	3	.....	3	3
	Electives to complete program.				

*Spring Quarter*

Ag.E. 72† or	Applied Electricity .....	3	.....	2	4
Ag.E. 73*	Steam Boilers and Heat Engines.....	3	1	1	4
C.E. 146	Plain Concrete .....	3	.....	2	4
	Electives to complete program.				

## RECOMMENDED ELECTIVES§

The following courses are suggested for the guidance of students who wish to elect work along the general lines indicated.

*Farm Structures*

Course No.	Title	Credits
Ag.E. 44s	Advanced Drawing .....	2
Ag.E. 111f,112w,113s	Farm Building Problems, per quarter.....	2-6
Arch. 57f,58w,59s	Building Materials and Methods, per quarter.....	2
For. 10w	Farm Forestry .....	3
Hort. 24w	Principles of Landscape Design.....	3

\* Given only in alternate years, 1942-43, 1944-45, etc.

† Given only in alternate years, 1941-42, 1943-44, etc.

§ Students taking the combined five-year course in agricultural engineering and business administration see statement on page 37.

*Farm Power and Machinery*

Course No.	Title	Credits
M.E. 18f,w	Machine Shop Practice .....	2
M.E. 121f	Machine Design .....	2
M.E. 132w	Thermodynamics .....	3
M.E. 150f,w	Internal Combustion Engines .....	3
Met. 156w	Metallography .....	3
Ag.E. 121f,122w,123s	Farm Power and Machinery Problems, per quarter.....	2-6
Ag.E. 126w	Selection of Farm Equipment .....	3
E.E. 43f,44w,45s	Electric Power, per quarter .....	3

*Land Reclamation and Development*

Ag.E. 28w	Land Clearing .....	3
Ag.E. 101f,102w,103s	Advanced Drainage Problems, per quarter .....	2-6
C.E. 161f	Power .....	4
M.&M. 130f	Open Channel Flow .....	3
M.&M. 190	Mechanics of Similitude and Dimensional Analysis .....	3

*General*

Ag.Econ. 103	Farm Operation .....	3
Bot. 1	General Botany .....	3
Hort. 6	Fruit Growing .....	3

## ARCHITECTURE

The work in architecture offered by the Institute of Technology includes courses dealing with the history, theory, and practice of architecture and the allied arts of design. It can be taken in accordance with any one of the four following plans:

1. Four-year course leading to the degree of bachelor of arts (B.A.) with a major in architecture, in the College of Science, Literature, and the Arts.
2. Four-year course leading to the degree of bachelor of arts (B.A.) with a major in fine arts, in the College of Science, Literature, and the Arts.

Plans 1 and 2 are intended for students who want to combine with their academic training, whether for cultural or vocational reasons, some study of architecture, drawing, painting, or sculpture. Plan 1 offers an advantageous approach to the five- and six-year professional courses in architecture described below, or to further training in the special fields of community and regional planning, landscape architecture, or decorative, industrial, and interior design. For further information see the Bulletin of the College of Science, Literature, and the Arts and the Combined Class Schedule.

3. Five-year course leading to the degree of bachelor of architecture (B.Arch.) in the Institute of Technology.
4. Six-year course leading to the degree of bachelor of arts (B.A.) with a major in architecture, in the College of Science, Literature, and the Arts and the degree of bachelor of architecture (B.Arch.) in the Institute of Technology.

Plans 3 and 4 are intended primarily for students who expect to enter the professional practice of architecture in any of its many recognized phases. It is assumed that the students taking them have a definite interest in architecture and a natural aptitude for the actual processes of designing buildings. They provide training which, when supplemented by practical experience in architects' offices, places the student in line for recognition as a practicing architect according to the

registration laws of the various states. They also serve as advantageous approaches to various fields in government and industry where architectural skill and knowledge are valuable. For further information see below for the five-year course, page 43 for the six-year course.

The work in architecture included in these courses falls into three general divisions. One is theory, presenting the science, philosophy, and history which form the background of architectural design. The second is practice in drawing and modeling as a means of expression in architectural design. The third and principal division is continued practice in all phases of architectural design itself, including both composition and construction.

As high school preparation for either the five-year or six-year course, higher algebra and solid geometry are essential; physics, chemistry, history, and foreign language are strongly recommended; instrumental and freehand drawing are advantageous.

Whether the student elects the five-year or the six-year course will depend on the time and means at his disposal. He will find it highly desirable to supplement and broaden his technical training by as much general academic work of college grade as he finds possible. College work taken at institutions other than Minnesota can be readily adjusted either to Plan 3 or to Plan 4. In any such work college algebra, trigonometry, and analytic geometry must be included as essential prerequisites to certain courses in structural design. Selections from language, history, economics, political science, sociology, physics, and chemistry are recommended. Prospective students should note that it takes normally four years to complete the required work in architectural design, regardless of how much other work they may have to their credit, and should calculate their time accordingly.

#### FIVE-YEAR COURSE

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of at least 225 credits.

The following program is that normally followed by students entering from high school. It will naturally be modified and condensed for students with previous college experience. It may also be modified by the student's progress in design and drawing since that is based on achievement, rather than time. The work of the first year is identical with the first year of the major in architecture in the College of Science, Literature, and the Arts and students may transfer from one course to the other at the end of that time without loss of credit toward either degree.

The choice and distribution of elective subjects should be arranged in advance by consultation with advisers in the School of Architecture. The purpose of these electives is: (1) to provide as much general education as possible, (2) to provide a certain degree of professional specialization in the various phases of architectural theory and practice.

#### FIRST YEAR\*

##### *Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Engl. 4	Composition .....	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I .....	2	.....	.....	4
	Electives†				

\* See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in Preparatory English.

† For list of elective courses in other colleges, see page 88.



*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 3	Freshman Mathematics for Architects.....	5	5	.....	.....
Engl. 5	Composition .....	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I .....	2	.....	.....	4
	Electives†				

*Spring Quarter*

M.&M. 4	Freshman Mathematics for Architects.....	5	5	.....	.....
Engl. 6	Composition .....	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I .....	2	.....	.....	4
	Electives†				

SECOND YEAR

*Fall Quarter*

M.&M. 91	Calculus for Architects.....	4	4	.....	.....
Arch. 4	Graphic Representation .....	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II.....	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I .....	5	.....	.....	15
	Electives†				

*Winter Quarter*

M.&M. 92	Mechanics for Architects .....	4	4	.....	.....
Arch. 5	Graphic Representation .....	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II.....	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I .....	5	.....	.....	15
	Electives†				

*Spring Quarter*

M.&M. 93	Strength of Materials for Architects.....	4	4	.....	.....
Arch. 6	Graphic Representation .....	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II.....	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I .....	5	.....	.....	15
	Electives†				

THIRD YEAR

*Fall Quarter*

Arch. 51	History of Architecture .....	3	.....	3	.....
Arch. 57	Building Materials and Methods.....	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
C.E. 38	Structural Analysis and Design.....	3	.....	3	.....

*Winter Quarter*

Arch. 52	History of Architecture .....	3	.....	3	.....
Arch. 58	Building Materials and Methods.....	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
C.E. 39	Structural Analysis and Design.....	3	.....	3	.....

*Spring Quarter*

Arch. 53	History of Architecture .....	3	.....	3	.....
Arch. 59	Building Materials and Methods.....	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
C.E. 41	Structural Analysis and Design.....	3	.....	3	.....

† For list of elective courses in other colleges, see page 88.

## INSTITUTE OF TECHNOLOGY

## FOURTH YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Arch. 101	Building Materials and Methods .....	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III .....	9	.....	.....	27
E.E. 40	Electrical Wiring and Equipment .....	2	.....	2	.....
	Electives†				

*Winter Quarter*

Arch. 102	Building Materials and Methods .....	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III .....	9	.....	.....	27
C.E. 171	Sanitary Engineering .....	2	.....	2	.....
	Electives†				

*Spring Quarter*

Arch. 103	Building Materials and Methods .....	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III .....	9	.....	.....	27
M.E. 164	Heating and Ventilation .....	2	.....	2	.....
	Electives†				

## FIFTH YEAR

*Fall Quarter*

Arch. AD-III	Architectural Design, Grade III .....	9	.....	.....	27
	Electives†				

*Winter Quarter*

Arch. AD-III	Architectural Design, Grade III .....	9	.....	.....	27
Arch. 105	Professional Practice .....	2	.....	2	.....
	Electives†				

*Spring Quarter*

Arch. AD-IV	Architectural Thesis .....	12	.....	.....	36
	Electives†				

## ELECTIVE COURSES

The following courses are recommended as electives. They should be chosen and distributed so as to keep the normal schedule as nearly as possible to 15 credits per quarter. (Four- and five-credit courses should be taken in the first year and three-credit courses in the second year.)

*First Year*

Course No.	Title	Credits
Arch. 1f-2w-3s	Introduction to Architecture (should be taken by all students entering without previous college or professional experience) per quarter .....	1

*First and Second Years*

Econ. 1f,w,s	Introduction to Economics .....	5
Econ. 3f,w,s	Elements of Money and Banking .....	5
Econ. 8f,w-9w,s	General Economics, per quarter .....	3
Engl. 7w-8s	Explorations in Literature, per quarter .....	3
Engl. 37f,w,s	Technical Discussions .....	3
Chem. 1f-2w	General Inorganic Chemistry, per quarter .....	4
F.A. 1f,2w,3s	Introduction to Art, per quarter .....	3
Fr. 1f,w,s-2f,w,s-3f,w,s	Beginning and Intermediate French, per quarter .....	5
Geog. 11f,w,s	Human Geography .....	5
Geol. 8f,w,s	Introduction to Geology .....	5

† For list of elective courses in other colleges, see page 88.

Course No.	Title	Credits
Germ. 1f,w,s-2f,w,s- 3f,w,s-4f,w,s	Beginning and Intermediate German, per quarter.....	5
Hist. 1f,w-2w,s-3f,s	European Civilization, per quarter .....	4
Hist. 11f-12w-13s	Medieval History, per quarter .....	3
Phys. 1f-2w-3s	Introduction to Physical Science, per quarter .....	3
Pol.Sci. 1f,w-2w,s-3s	American Government and Politics, per quarter .....	3
Psy. 1f,s-2w,s	General Psychology, per quarter .....	3
Soc. 1f,w,s	Introduction to Sociology .....	5
Span. 1f,w,s-2f,w,s- 3f,w,s-4f,w,s	Beginning and Intermediate Spanish, per quarter.....	5

*Third to Fifth Years*

Arch. 61f-62w-63s	Tutorial Work in History of Architecture, per quarter .....	2
Arch. 67f-68w-69s	Theory of Design, per quarter.....	2
Arch. 104f	Housing .....	3
Arch. 106s	Housing .....	2
Arch. 110f	Architectural Acoustics .....	2
Arch. ID-If,w,s	Interior Design .....	24
Arch. M-If,w,s	Modeling, Grade I .....	6
Arch. M-Iaf,w,s	Modeling for Architects .....	2
Arch. M-IIf,w,s	Modeling, Grade II .....	6

For other courses, and for details of the courses listed above, see this bulletin and the Combined Class Schedule.

SIX-YEAR COURSE IN ARTS AND ARCHITECTURE

During the first four years of this course the student is registered in the College of Science, Literature, and the Arts and follows the plan of study prescribed for a bachelor of arts degree with a major in architecture.

The following courses should be completed during this period:

Required for the major sequence:

Course No.	Title	Credits
Arch. 1-2-3	Introduction to Architecture.....	3
Arch. 4-5-6	Graphic Representation .....	6
Arch. 51-52-53	History of Architecture.....	9
Arch. 57-58-59	Building Materials and Methods.....	6
Arch. DP-I	Drawing and Painting, Grade I .....	6
Arch. DP-II	Drawing and Painting, Grade II .....	6
Arch. AD-I	Architectural Design, Grade I .....	15
Arch. AD-II	Architectural Design, Grade II .....	18

Additional requirements:

Math. 7-6-30	College Algebra, Trigonometry, Analytic Geometry.....	15
M.&M. 91-92-93	Calculus, Mechanics, Strength of Materials.....	12
C.E. 38-39-41	Structural Analysis and Design.....	9

Total ..... 105

During the last two years of the course, or upon completion of the requirements for the bachelor of arts degree, the student is registered in the School of Architecture of the Institute of Technology to complete the requirements for a bachelor of architecture degree as prescribed for the five-year course on page 40.

See also the Junior and Senior College requirements as given in the Bulletin of the College of Science, Literature, and the Arts; and Architecture, in the Combined Class Schedule.

## INTERIOR ARCHITECTURE\*

Four-year course leading to the degree of bachelor of interior architecture, B.Int.Arch.

This course requires normally four years for its completion, the first two years in the College of Science, Literature, and the Arts, and the last two years in the Institute of Technology, including 192 credits.

For the freshman and sophomore years, students register in the College of Science, Literature, and the Arts and complete the requirements of the Junior College for the major in architecture, including the following courses:

Course No.	Title	Credits
Arch. 4-5-6	Graphic Representation .....	6
Arch. DP-I	Drawing and Painting, Grade I .....	6
Arch. DP-II	Drawing and Painting, Grade II .....	6
Arch. AD-I	Architectural Design, Grade I .....	15

Having satisfied the requirements of the Junior College, students transfer to the Institute of Technology and pursue the following curriculum, amounting to 90 credits for the remaining two years:

## JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Arch. 51	History of Architecture.....	3	.....	3	.....
Arch. 57	Building Materials and Methods.....	2	.....	2	.....
Arch. 67	Theory of Design.....	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
	Electives				

*Winter Quarter*

Arch. 52	History of Architecture.....	3	.....	3	.....
Arch. 58	Building Materials and Methods.....	2	.....	2	.....
Arch. 68	Theory of Design.....	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
M.E. 3	Wood-Finishing .....	2	.....	.....	6
	Electives				

*Spring Quarter*

Arch. 53	History of Architecture.....	3	.....	3	.....
Arch. 59	Building Materials and Methods.....	2	.....	2	.....
Arch. 69	Theory of Design.....	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II.....	6	.....	.....	18
	Electives				

## SENIOR YEAR

*Fall Quarter*

Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. ID-I	Interior Design .....	8	.....	.....	24
	Electives				

*Winter Quarter*

Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. ID-I	Interior Design .....	8	.....	.....	24
	Electives				

*Spring Quarter*

Arch. DP-III	Drawing and Painting, Grade III.....	2	.....	.....	4
Arch. ID-I	Interior Design .....	8	.....	.....	24
	Electives				

\* Discontinued. No students accepted after 1939-40.

## CHEMISTRY AND CHEMICAL ENGINEERING

## FRESHMAN AND SOPHOMORE YEARS\*

## FRESHMAN YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 11	College Algebra .....	5	5	.....	.....
Inorg.Chem. 9	General Inorganic Chemistry.....	5	1	3	5
Engl. 4	Composition .....	3	3	.....	.....
Draw. 7	Drawing and Descriptive Geometry.....	3	.....	.....	8
or					
M.E. 15**	Survey of Manufacturing Processes.....	3	1	2	.....

*Winter Quarter*

M.&M. 12	Trigonometry .....	5	5	.....	.....
Inorg.Chem. 10	General Inorganic Chemistry.....	5	1	3	5
Engl. 5	Composition .....	3	3	.....	.....
Draw. 7	Drawing and Descriptive Geometry.....	3	.....	.....	8
or					
M.E. 15**	Survey of Manufacturing Processes.....	3	1	2	.....

*Spring Quarter*

M.&M. 13	Analytical Geometry .....	5	5	.....	.....
Inorg.Chem. 12	Semimicro Qualitative Analysis.....	5	2	1	6
Engl. 6	Composition .....	3	3	.....	.....
Draw. 8	Drawing and Descriptive Geometry.....	3	.....	.....	8
or					
M.E. 15**	Survey of Manufacturing Processes.....	3	1	2	.....
G.E. 13†	Orientation .....	0	.....	1	.....

## SOPHOMORE YEAR

*Fall Quarter*

M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
Inorg.Chem. 13	Semimicro Qualitative Analysis.....	5	1	2	8
Phys. 7	General Physics .....	5	1	4	2
German 24§	Chemical German .....	3	3	.....	.....

*Winter Quarter*

M.&M. 25	Calculus II: Integral.....	5	5	.....	.....
Anal.Chem. 1	Quantitative Analysis .....	5	1	1	10
Phys. 8	General Physics .....	5	1	4	2
German 25§	Chemical German .....	3	3	.....	.....

*Spring Quarter*

M.&M. 84	Technical Mechanics .....	5	5	.....	.....
Anal. Chem. 2	Quantitative Analysis .....	5	1	1	10
Phys. 9	General Physics .....	5	1	4	2
German 26§	Chemical German .....	3	3	.....	.....
Chem.E. 80¶	Chemical Engineering Materials.....	1	.....	2	.....

\* See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in Preparatory English.

† Students with more than one year advanced standing are exempted from G.E. 13. Women take one of the following courses in place of G.E. 13, Phys.Ed. 1f, 2w, 3s, 4f, 5w, or 6s.

§ Students who have had two years of high school German or one year of college German take Course 27-28-29.

¶ Required of chemical engineers only.

\*\* Advanced standing students are permitted to substitute for M.E. 15 any other shop course or laboratory arts given in the Physics Department.

## CHEMISTRY

Four-year course leading to the degree of bachelor of chemistry, B.Chem.

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of at least 207 credits.

This professional course in Chemistry is designed to provide thoro training in the fundamentals of chemistry and related subjects. It serves as a basis for further specialization and a foundation for graduate work. Its graduates secure positions in practical chemistry, research, and teaching, in chemical industries, the government service, in colleges and laboratories, etc.

For freshman and sophomore years, see page 45.

## JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Org.Chem. 51	Elementary Organic Chemistry.....	5	0	5	6
Phys.Chem. 101	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 104	Physical Chemistry Laboratory.....	2	1	.....	5
	Electives*				

*Winter Quarter*

Org.Chem. 52	Elementary Organic Chemistry.....	5	0	5	6
Phys.Chem. 102	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 105	Physical Chemistry Laboratory.....	2	1	.....	5
	Electives*				

*Spring Quarter*

Org.Chem. 153	Elementary Organic Chemistry.....	5	0	5	6
Phys.Chem. 103	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 106	Physical Chemistry Laboratory.....	2	1	.....	5
Chem.E. 131	Industrial Inorganic Chemistry.....	4	1	4	.....
	Electives*				

## SENIOR YEAR¶

*Fall Quarter*

Inorg.Chem. 103	Advanced Inorganic Chemistry.....	3	.....	3	.....
Anal.Chem. 131	Applications of Indicators .....	3	.....	2	5
Phys.Chem. 161§	Nuclear Chemistry and Radioactivity.....	3	.....	3	.....
Chem.E. 132	Industrial Organic Chemistry.....	4	.....	5	.....
German 41	Chemical German .....	2	2	.....	.....
	Electives*				

*Winter Quarter*

Inorg.Chem. 104	Advanced Inorganic Chemistry.....	3	.....	3	.....
Anal.Chem. 132†	Electrometric Measurements and Titrations .....	3	.....	2	5
Phys.Chem. 162§	Nuclear Chemistry and Radioactivity.....	3	.....	3	.....
German 42	Chemical German .....	2	2	.....	.....
	Electives*				

*Spring Quarter*

Inorg.Chem. 105	Advanced Inorganic Chemistry.....	3	.....	3	.....
German 43	Chemical German .....	2	2	.....	.....
	Electives*				

NOTE.—Near the close of the junior year, each student will choose a major adviser from the list on page 47. In consultation with the adviser he will plan a program of work for the entire senior year, based normally upon concentration of electives around a chosen field of chemistry.

\* For list of elective courses in other colleges, see page 88.

† For permissible substitute, see page 87.

§ In place of Phys. Chem. 161-162, students may substitute six credits in physical chemistry courses to which Phys. Chem. 103 is a prerequisite.

¶ Students who are planning on taking graduate work are urged to take French as one of the electives in the senior year.

## LIST OF ADVISERS FOR SENIORS

Inorganic Chemistry: Professors Sneed, Cohen, Heisig, Barber, Klug, Maynard, Pervier.

Analytical Chemistry: Professors Kolthoff, Geiger, Sandell.

Organic Chemistry: Professors Smith, Lauer, Koelsch.

Physical Chemistry: Professors Lind, MacDougall, Reyerson, Livingston, Hull.

Chemical Engineering: Professors Mann, Montillon, Montonna, Pike, Stoppel, Grove.

## SPECIALIZATION IN BACTERIOLOGY, BIOCHEMISTRY, AND GEOLOGY

For the benefit of students in chemistry who may desire to specialize in related fields, minor groups of electives have been arranged in bacteriology, biochemistry, and geology which may be taken in the junior and senior years in addition to the required courses of the regular chemistry curriculum shown above. The completion of one of these groups will qualify the chemistry graduate to enter upon graduate work towards the Ph.D. degree in that department, thus providing an exceptionally strong foundation in chemistry for specialization in the chosen field.

## MINOR IN BACTERIOLOGY

## JUNIOR YEAR

Four credits of botany or zoology are prerequisite to Bacteriology 53. Botany 1f, 4 credits, or Zoology 14f-15w, 6 credits, should be taken in the junior year to satisfy this requirement. By special arrangement it may be possible to take Bacteriology 53, 5 credits, in the winter or spring quarter of the junior year, if desired.

## SENIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Bact. 53	General Bacteriology .....	5	.....	3	6
Bact. 121	Physiology of Bacteria.....	3	.....	3	.....

*Winter Quarter*

Bact. 122	Physiology of Bacteria.....	3	.....	3	.....
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*Spring Quarter*

Bact. 123	Applied Bacteriology .....	3	.....	3	.....
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## MINOR IN BIOCHEMISTRY

## JUNIOR YEAR

*Fall Quarter*

Zool. 14†	General Zoology .....	3	.....	2	4
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*Winter Quarter*

Zool. 15†	General Zoology .....	3	.....	2	4
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## SENIOR YEAR

*Fall Quarter*

Ag. Biochem. 113	Biochemical Laboratory Methods.....	2	.....	.....	6
Ag. Biochem. 119	Colloids .....	3	.....	3	.....
Bact. 53	General Bacteriology .....	5	.....	3	6

*Winter Quarter*

Ag. Biochem. 114	Biochemical Laboratory Methods.....	2	.....	.....	6
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† Nine credits in Botany may be substituted for Zoology 14-15.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Ag.Biochem. 115	Biochemical Laboratory Methods.....	2	.....	.....	6
Ag.Biochem. 123	Enzymes .....	3	.....	3	.....

## MINOR IN GEOLOGY

## JUNIOR YEAR

*Fall Quarter*

Min. 23	Elements of Mineralogy.....	4	1	2	4
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*Winter Quarter*

Min. 24	Elements of Mineralogy.....	4	1	2	4
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## SENIOR YEAR

*Fall Quarter*

Geol. 1	General Geology .....	3	1	3	.....
Geol. A	General Geology Laboratory.....	2	.....	.....	4
Geol. 121	Crystallography .....	3	.....	3	2

*Winter Quarter*

Geol. 3	General Geology (Dynamic and Economic) ...	3	1	3	.....
Geol. C	General Geology Laboratory.....	2	.....	.....	4

## CHEMICAL ENGINEERING

Four-year course leading to the degree of bachelor of chemical engineering, B.Ch.E.

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of 218 credits.‡

Chemical engineering deals with the unit operations, such as crushing, grinding, sifting, mixing, fluid flow and heat flow, filtration, evaporation, drying, distillation, extraction, absorption, and crystallization, organic processes that are so vital in making any industry based on a chemical transformation of matter a commercial success. The chemist uses these operations in the laboratory but in order to apply them to large scale industrial processes he must have a thoro understanding of the fundamental physiochemical, chemical, and engineering principles on which they are based. The study of such principles constitutes that branch of engineering known as chemical engineering. For this purpose the chemical engineer must be thoroly trained in the various branches of chemistry, physics, and mathematics and have a good training in the fundamentals of mechanical, electrical, and chemical engineering so that he can design, construct, and successfully operate a plant using these unit operations.

The chemical engineer is primarily a producer. It is his province to develop a process from the laboratory stage through semi-works equipment to the production stage which uses engineering materials for the manufacture of unit process equipment in accordance with fundamental chemical engineering principles.

As many industries are based on some chemical operation, the chemical engineer is much in demand. He may be engaged in the manufacture of inorganic products—the mineral acids, alkalies, ammonia, paint pigments, fertilizers; in the organic

‡ Students who are planning to take graduate work are urged to take French as one of the electives in the senior year.



industries—dyes, explosives, lacquers, solvents, medicinals; in the manufacture of gases—coal gas, carbureted blue gas, hydrogen, acetylene, helium; in the electrochemical industries such as the manufacture of graphite, calcium carbide, carborundum and other abrasives, wet and dry batteries, electroplating; in the metallurgical industries; and even in the food industries such as the manufacture of sugar, flour, salt, and starch. There are many others such as leather, paper, textiles, soaps, petroleum, glass, and cement.

In these industries the chemical engineer does investigational work, development work, design of equipment, and plant operation. Some enter the field of sales engineering and technical writing.

Students taking the five-year combined course in chemical engineering and business administration may substitute business courses for M.&M. 86.

For freshman and sophomore years see page 45.

JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chem.E. 101	Unit Operations .....	3	2	2	.....
Chem.E. 105	Fuels and Combustion.....	4	2	2	4
Org.Chem. 51	Elementary Organic Chemistry.....	5	.....	5	6
M.&M. 86†	Hydraulics with Laboratory.....	3	2	.....	2
Phys.Chem. 101	Physical Chemistry .....	3	1	3	.....

*Winter Quarter*

Chem.E. 102	Unit Operations .....	6	4	2	4
Org.Chem. 52	Elementary Organic Chemistry .....	5	.....	5	6
Phys.Chem. 102	Physical Chemistry .....	3	1	3	.....
M.E. 38	Heat Engines .....	3	1	2	.....
M.E. 39‡	Heat Engines Laboratory.....	1	.....	.....	3

*Spring Quarter*

Chem.E. 103	Unit Operations .....	6	4	2	4
Org.Chem. 153	Elementary Organic Chemistry .....	5	.....	5	6
Phys. Chem. 103	Physical Chemistry .....	3	1	3	.....
Chem.E. 131	Industrial Inorganic Chemistry.....	4	1	4	.....

*Summer Session*

Summer practice consisting of Chem.E. 151f,su-152w,su, Chemical Manufacture, 6 cred., will be taken by students in Chemical Engineering in the regular Summer Session between their junior and senior years. It is required for the degree of bachelor of chemical engineering.

SENIOR YEAR

*Fall Quarter*

Phys.Chem. 104	Physical Chemistry Laboratory.....	2	1	.....	5
E.E. 43	Electric Power .....	3	.....	2	2
Chem.E. 121	Chemical Engineering Economics.....	3	.....	3	.....
Chem.E. 132	Industrial Organic Chemistry.....	3	1	4	.....
M.&M. 85†	Strength of Materials.....	3	3	.....	.....
M.&M. 87†	Materials Laboratory .....	1	.....	.....	2
Met. 160§	Metallography .....	3	.....	2	3
	Electives*				

\* For list of elective courses in other colleges, see page 88.

† For permissible substitute, see page 87.

§ Met. 160 may be taken fall or winter quarter.

¶ Offered both winter and spring quarters.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Phys.Chem. 105	Physical Chemistry Laboratory.....	2	1	.....	5
E.E. 44	Electric Power .....	3	.....	2	2
Chem.E. 117	Chemical Engineering Equipment Design.....	3	2	1	4
Met. 160§	Metallography .....	3	.....	2	3
	Electives*				

*Spring Quarter*

Phys.Chem. 106	Physical Chemistry Laboratory.....	2	1	.....	5
E.E. 45	Electric Power .....	3	.....	2	2
Chem.E. 118	Chemical Engineering Equipment Design.....	3	2	1	4
Chem.E. 187	Chemical Engineering Trip (spring vacation)	2	.....	.....	.....
	Electives*				

## CIVIL ENGINEERING

Two four-year courses are offered: Civil Engineering I and Civil Engineering II (Public Service Option).

## CIVIL ENGINEERING I

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation. This is an average of about 17 credits per quarter.

The principal aim of the curriculum in civil engineering is to present to the student an opportunity to become familiar with the methods of science, so that in his attack upon any professional problem he may employ his abilities with economy and secure dependable conclusions. A secondary but important object of the course is to train the student in technique, so that at graduation he may be an economic asset to his employer.

The technique of surveying and platting, drawing, and certain laboratory procedures is taught throughout the course. Typical problems of railroad, highway, hydraulic, structural, and municipal engineering occupy the greater part of the last two years. In the junior year, there is a course of lectures and conferences on the relations of engineering projects to business and to public affairs. Elective courses are available in each of the three upper years; these offer a wide range of choice to the student who desires to extend his range of interests to those fields of knowledge and action related to civil engineering, but not strictly included therein.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
Draw. 21	Drafting .....	2	.....	.....	6
C.E. 11	Surveying .....	3	1	.....	7
	Electives*				

*Winter Quarter*

M.&M. 25	Calculus II: Integral.....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
Draw. 22	Structural Detailing .....	2	.....	.....	6
C.E. 12	Surveying .....	3	1	.....	7
	Electives*				

\* For list of elective courses in other colleges, see page 88.

§ Met. 160 may be taken fall or winter quarter.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
Draw. 23	Structural Detailing .....	2	.....	.....	6
C.E. 13	Surveying .....	3	1	.....	7
	Electives*				

JUNIOR YEAR

*Fall Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2
C.E. 14	Surveying .....	3	.....	.....	8
C.E. 31	Stresses in Structures .....	2	.....	2	2
C.E. 51	Highways and Pavements .....	3	.....	2	3
	Electives*				

*Winter Quarter*

M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
C.E. 15	Surveying .....	2	.....	4	.....
C.E. 21	Railway Engineering .....	2	1	.....	4
C.E. 32	Stresses in Structures .....	3	.....	2	4
C.E. 52	Highways and Pavements .....	3	1	1	4
	Electives*				

*Spring Quarter*

M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
C.E. 16	Surveying .....	2	.....	2	4
C.E. 22	Railway Engineering .....	2	1	.....	4
C.E. 33	Elementary Structural Design .....	4	.....	2	6
C.E. 53	Civil Engineering Practice .....	3	1	2	.....
	Electives*				

*Summer Camp*

C.E. 23	Summer camp is held in the vacation preceding the senior year for 6 weeks beginning about the middle of August. Required of all students taking the courses in Civil Engineering, Fee, \$25 .....	9			
	Health Service fee, \$1.				

SENIOR YEAR

*Fall Quarter*

C.E. 121	Railway Engineering .....	3	.....	1	6
C.E. 130	Statically Indeterminate Structures .....	3	.....	2	2
C.E. 141	Reinforced Concrete .....	3	.....	2	2
C.E. 161	Power .....	4	.....	2	6
C.E. 146	Plain Concrete .....	3	.....	2	4
or					
G.E. 101	Contracts and Specifications .....	3	.....	3	.....
	Electives*				

\* For list of elective courses in other colleges, see page 88.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
C.E. 131	Analysis of Bridges and Buildings.....	2	.....	2	2
C.E. 142	Reinforced Concrete Design.....	3	.....	2	2
C.E. 162	Water Supply and Sewerage.....	3	.....	2	4
C.E. 109	Cadastral Surveying .....	2	.....	2	.....
or					
C.E. 124	Transportation .....	3	3	.....	.....
or					
C.E. 147	Foundations .....	2	.....	2	.....
or					
C.E. 156	Highway Transport .....	3	.....	3	.....
M.E. 42	Power .....	4	2	2	.....
C.E. 137†	Structural Laboratory .....	2	.....	1	3
or					
G.E. 101	Contracts and Specifications.....	3	.....	3	.....
	Electives*				

*Spring Quarter*

C.E. 132	Design of Bridges and Buildings.....	2	.....	1	3
C.E. 163	Water Supply and Sewerage.....	3	.....	2	5
C.E. 146	Plain Concrete .....	3	.....	2	4
or					
C.E. 137†	Structural Laboratory .....	2	.....	1	3
E.E. 42	Power .....	3	3	.....	.....
	Electives*				

## CIVIL ENGINEERING II (PUBLIC SERVICE OPTION)

The purpose of this curriculum is to present civil engineering as a part of the larger undertakings of social economy. All technical engineering practice exists in an environment of governmental or industrial control; this option places emphasis on the external relationships of engineering to these controlling forces as well as on its internal techniques. Graduates will be eligible candidates for graduate fellowships offered in public service and public health engineering.

The freshman year is identical with that of other engineering curricula. The mathematics and science courses common to all engineering courses as well as the elements of civil engineering are required subjects. The electives provided permit the student to take advanced work in surveying or structural engineering or highway engineering or advanced work in physical sciences, political science, public health, or business administration.

Applications for admission must be approved by the Department of Civil Engineering.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
C.E. 11	Surveying .....	3	1	.....	7
Org.Chem. 54	Elementary Organic Chemistry .....	3	1	3	.....
Econ. 8	General Economics .....	3	3	.....	.....

\* For list of elective courses in other colleges, see page 88.

† C.E. 137 limited to 20 students.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
C.E. 12	Surveying .....	3	1	.....	7
Org.Chem. 55	Elementary Organic Chemistry .....	3	1	3	.....
Econ. 9	General Economics .....	3	3	.....	.....

*Spring Quarter*

M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
C.E. 13	Surveying .....	3	1	.....	7
Anal.Chem. 7	Quantitative Analysis .....	4	1	1	8
Econ. 28	Business Law .....	3	3	.....	.....

## JUNIOR YEAR

*Fall Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2
C.E. 31	Stresses in Structures .....	2	.....	2	2
C.E. 51	Highways and Pavements .....	3	.....	2	3
Econ. 29	Principles of Accounting .....	3	3	.....	.....
Pol. Sci. 1	American Government and Politics .....	3	3	.....	.....

*Winter Quarter*

M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
C.E. 32	Stresses in Structures .....	3	.....	2	4
B.A. 58	Elements of Public Finance .....	3	3	.....	.....
Pol.Sci. 2	American Government and Politics .....	3	3	.....	.....
Sp. 1	Fundamentals of Speech .....	3	3	.....	.....

*Spring Quarter*

M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
C.E. 33	Elementary Structural Design .....	4	.....	2	6
Econ. 161	Labor Problems and Trade Unionism .....	3	3	.....	.....
Pol.Sci. 3	American Government and Politics .....	3	3	.....	.....

## SENIOR YEAR

*Fall Quarter*

C.E. 141	Reinforced Concrete .....	3	2	.....	2
C.E. 146	Plain Concrete .....	3	.....	2	4
C.E. 161	Power .....	4	.....	2	6
P.M.&P.H. 50	Public and Personal Health .....	3	3	.....	.....
G.E. 101	Contracts and Specifications .....	3	.....	3	.....
	Electives				

*Winter Quarter*

C.E. 162	Water Supply and Sewerage .....	3	.....	2	4
Bact. 53	General Bacteriology .....	5	.....	4	8
Econ. 167	Personnel Administration .....	3	3	.....	.....
M.E. 42	Power .....	4	2	2	.....
	Electives				

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
C.E. 163	Water Supply and Sewerage .....	3	.....	2	5
C.E. 165	Public Health Engineering .....	3	.....	3	.....
E.E. 42	Power .....	3	3	.....	.....
	Electives				

Three groups of electives are suggested:

A. Sciences and Mathematics	B. Social Sciences and Language	C. Engineering
Chemistry	Economics and Business	Surveying
Physics	Political Science	Highway Engineering
Geology	Public Speaking	Railway Engineering
Mathematics	English	Structural Engineering
	Modern Language	Metallography

## ELECTRICAL ENGINEERING

Four-year course leading to the degree of bachelor of electrical engineering, B.E.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The course in Electrical Engineering is designed to fit the student for a position of responsibility in the electrical field. This work is based upon the principles of electricity and magnetism contained in the prescribed courses in general physics and upon the principles of mathematics. In the senior year, specialized courses may be selected in the field of electric power generation, transmission, and utilization, in telephone and radio communication or in illumination.

The main laboratory of the department is well equipped for preliminary training in the operation of electrical machinery and for advanced research problems in this field. The communication laboratories contain, besides the general equipment for the study of circuits, special apparatus for the study of radio and electro-acoustical problems.

Graduate courses in this department, as well as in physics and mathematics, are available for those with exceptional ability who desire training beyond the usual four-year undergraduate curriculum.

Students taking the five-year combined course with business administration may substitute business courses for Draw. 26, M.&M. 141, M.E. 13, 17, and 26, Phys. 144, and E.E. 132, 134, and 136. In addition they are required to take courses E.E. 141, 142, and 143.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
M.E. 13	Forging and Welding .....	2	.....	2	3
E.E. 11	Elements of Electrical Engineering .....	3	2	1	.....
	Electives*				

*Winter Quarter*

M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
Draw. 26†	Drafting .....	2	.....	.....	6
E.E. 13	Elements of Electrical Engineering .....	3	2	1	.....
E.E. 14	Elements of Electrical Engineering Laboratory .....	1	.....	.....	2
	Electives*				

\* For list of elective courses in other colleges, see page 88.

† For permissible substitute, see page 87.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
E.E. 15	Elements of Electrical Engineering .....	3	2	1	.....
E.E. 16	Elements of Electrical Engineering Laboratory .....	1	.....	.....	2
M.E. 17	Machine Shop Practice .....	2	.....	2	3
	Electives*				

## JUNIOR YEAR§

*Fall Quarter*

M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
E.E. 111	Electrical Engineering .....	5	5	.....	.....
E.E. 112	Electrical Engineering Laboratory .....	2	.....	.....	4
Phys. 144	Electrical Measurements .....	3	1	1	4
	Electives*				

*Winter Quarter*

M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
E.E. 113	Electrical Engineering .....	3	3	.....	.....
E.E. 114	Electrical Engineering Laboratory .....	1	.....	.....	2
E.E. 117	Engineering Electronics .....	3	2	.....	2
M.E. 26	Mechanism and Kinematics .....	3	3	.....	.....
	Electives*				

*Spring Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2
E.E. 115	Electrical Engineering .....	3	3	.....	.....
E.E. 116	Electrical Engineering Laboratory .....	1	.....	.....	2
E.E. 119	Engineering Electronics .....	3	2	.....	2
	Electives*				

## SENIOR YEAR

## POWER OPTION

*Fall Quarter*

E.E. 121	Electrical Engineering .....	3	3	.....	.....
E.E. 122	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 132†	Electrical Design .....	2	2	.....	.....
M.E. 40†	Heat Engines .....	3	2	.....	3
	Electives*				

*Winter Quarter*

E.E. 123	Electrical Engineering .....	3	3	.....	.....
E.E. 124	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 134†	Electrical Design .....	2	2	.....	.....
M.E. 41†	Heat Engines .....	3	2	.....	3
	Electives*				

*Spring Quarter*

E.E. 100	Inspection Trip (spring vacation) .....	2	.....	.....	.....
E.E. 125	Electrical Engineering .....	3	3	.....	.....
E.E. 126	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 136††	Electrical Design .....	2	2	.....	.....
M.E. 55†	Internal Combustion Engines .....	3	2	.....	3
	Electives*				

\* For list of elective courses in other colleges, see page 88.

† Students specializing in chemistry, mathematics, or physics may substitute electives in that department for courses E.E. 132, 134, 136 and M.E. 40, 41, and 55. Such specialization requires at least 18 credits of elective work in chemistry, physics, or mathematics.

§ Students expecting to elect the communication option in the senior year must take E.E. 64-65-66, Elements of Communication, in the junior year.

†† Students specializing in business may substitute an approved elective in that department for Course E.E. 136.

## COMMUNICATION OPTION§

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
E.E. 121	Electrical Engineering .....	3	3	.....	.....
E.E. 122	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 161	Radio Communication .....	3	.....	2	3
E.E. 164	Electrical Communication .....	4	.....	2	4
	Electives*				

*Winter Quarter*

E.E. 123	Electrical Engineering .....	3	3	.....	.....
E.E. 124	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 162	Radio Communication .....	3	.....	2	3
E.E. 165	Electrical Communication .....	4	.....	2	4
	Electives*				

*Spring Quarter*

E.E. 100	Inspection Trip (spring vacation).....	2	.....	.....	.....
E.E. 125	Electrical Engineering .....	3	3	.....	.....
E.E. 126	Electrical Engineering Laboratory .....	2	.....	.....	4
E.E. 163	Radio Communication .....	3	.....	2	3
E.E. 166	Electrical Communication .....	4	.....	2	4
	Electives*				

## SPECIALIZED COURSES IN ELECTRICAL ENGINEERING

The number of electives in the electrical engineering course makes it practicable to obtain either a broad or a specialized education. Further to facilitate such election, certain courses in the senior year may be replaced by substitutes in chemistry, mathematics, or physics, subject to the approval of the head of the department and the Students' Work Committee. By properly choosing prerequisite subjects during the sophomore or junior year, a far-seeing student may prepare for advanced specialized courses in the following undergraduate and graduate years. As examples, one may specialize in business, chemistry, communication, illumination, manufacturing, military science and tactics, naval science and tactics, physics, power generation and distribution, public utilities, railway engineering, or other chosen line. Students are advised to consult with their classifiers, or with the head of the department, concerning desirable sequences of general or special courses.

## ENGINEERING AND BUSINESS ADMINISTRATION

For many years engineers have recognized the importance of a knowledge of the principles of economics in connection with their profession. Engineering students are encouraged to elect courses of various kinds in the fields of economics and administration when it is possible for them to find time to do so. This is true in all of the branches of engineering.

With the vast expansion which has taken place in the manufacturing industries in the United States, there has arisen a need for engineers having more training in economics and administration than is usually possible in the four-year engineering courses. To meet this need special groups of elective courses have been arranged. The recent economic stress has further emphasized the importance of a combination of engineering and business training in preparation for the industrial problems of the future.

\* For list of elective courses in other colleges, see page 88.

§ Students expecting to elect the communication option in the senior year must take E.E. 64-65-66, Elements of Communication, in the junior year.



The *Engineering Prebusiness course* described on page 71 provides a four-year combined curriculum in business administration with a background of the fundamental mathematics, chemistry, English, physics, and drawing, of the engineering courses.

As a further step to provide adequate training in engineering or chemistry, combined with business administration, a plan of *five-year courses leading to two degrees* has been arranged for the capable student who wishes to enter upon a comprehensive professional training in this combined field.

Students who desire to elect courses in economics and business administration without undertaking the five-year combined course may well include the economics, business law, accounting, and corporation finance of the first two years in this program and then select such other courses of the sequence as they may prefer. No special optional group of courses is necessary for this purpose.

### FIVE-YEAR COMBINED COURSES WITH BUSINESS ADMINISTRATION

The new plan of five-year combined courses in Engineering, Architecture (six years), or Chemistry with Business Administration enables the student to complete the requirements for the Bachelor's degrees in both fields, as for example, bachelor of electrical engineering and bachelor of business administration. Five years will usually be necessary for the completion of the combined course, but a longer time, perhaps six years, may be required if suitable programs cannot be arranged for the five-year period. This will depend upon the particular curriculum with which the combination with business administration is made.

For this purpose the School of Business Administration will accept the 74 credits in business subjects shown in the following list in conjunction with one of the regular curricula in engineering, architecture, or chemistry, as satisfying the requirements for the degree of bachelor of business administration. The student receives his engineering degree upon the completion of his regular course, altho this may not be until the end of the fifth year. He is not eligible for the degree in business administration on this 74-credit basis until *the work is taken in conjunction with one of the regular curricula in this college.*

The business courses are intended to be spread over four years, beginning the business sequence in the sophomore year by taking economics and business law, 3 credits per quarter, as electives, in addition to the usual engineering program.

Normally, some of the required technical work of the senior year will be postponed to the fifth year to make room for business courses, in order to secure a desirable distribution of the latter rather than to concentrate them in the fifth year. Not more than 28 credits of business should be left for the fifth year.

In certain curricula, special concessions are made to students taking this five-year combined course by permitting them to omit certain required courses or to substitute business courses for them. (See Aeronautical, Agricultural, Chemical, and Electrical Engineering.)

Under this plan the student will be registered in the Institute of Technology and in the School of Business Administration for the entire combined program. His registration for each quarter beginning with the school year is subject to *approval by the adviser representing the School of Business Administration* as well as by the regular classifier.

No student is considered officially registered in the five-year business engineering combination unless he has the approval of the Five-year Student Work Committee, Room 201 Mechanical Engineering.

The following order and distribution by years are suggested. With the approval of the adviser in the School of Business Administration both may be varied, however, so as to accommodate individual programs. However, to avoid conflicts in programming classes the student should follow the arrangement for his curriculum given on pages 58 to 70.

Students are required to maintain a "C" average in the School of Business Administration courses. If this grade has not been maintained upon the completion of the 74 credits the student will then be held for the full School of Business Administration requirements as provided in the Engineering Prebusiness program.

## SECOND YEAR

Course No.	Title	Credits		
		F	W	S
Econ. 8f,w-9w,s	General Economics .....	3	3	.....
Econ. 28f,s	Business Law (8, 9) .....	.....	.....	3

## THIRD YEAR

Econ. 54f-55w*	Principles of Accounting .....	4	4	.....
B.A. 77f,w,s	Survey of Marketing .....	.....	.....	3

## FOURTH YEAR

B.A. 58f,w,s	Elements of Public Finance (8, 9) .....	.....	3	.....
B.A. 70f	Statistics Survey Course (8, 9) .....	3	.....	.....
B.A. 71f,w,s	Transportation: Services and Charges I (8, 9) .....	.....	.....	3
B.A. 89f,w,s§	Production Management (8, 9) .....	.....	.....	3
B.A. 112f,w,s	Business Statistics (70) .....	.....	3	.....
B.A. 130f,s	Cost Accounting Survey (26, 29 or 55) .....	.....	.....	3
B.A. 142f,w,s	Advanced Money and Banking (8, 9) .....	3	.....	.....
B.A. 167f,w	Personnel Administration (161) .....	.....	3	.....
Econ. 161f,w,s	Labor Problems and Trade Unionism (8, 9) .....	3	.....	.....

## FIFTH YEAR

B.A. 155f,w,s	Corporation Finance (8, 9) .....	3	.....	.....
B.A. 101f,w,s- 102f,w,s	Advanced General Economics (8, 9) .....	3	3	.....
B.A. 165f,w,s	Economics of Public Utilities (8, 9) .....	.....	.....	3
B.A. 180f-181w- 182Gs	Senior Topics: Production Management (89, 130) .....	3	3	3
Econ. 149f,w,s	Business Cycles (142) .....	.....	3	.....

One of the following:

B.A. 133s	Cost Accounting Methods .....	.....	.....	3
B.A. 139f,w,s	Advanced General Accounting (26) .....	.....	.....	3
B.A. 180f-181Cw	Senior Topics: Marketing .....	3	3	.....

Total credits .....

74

### AERONAUTICAL ENGINEERING WITH BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Aero.E. 3	Aeronautics .....	3	3	.....	.....
Econ. 8	General Economics .....	3	3	.....	.....
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
M.E. 70	Mechanical Technology .....	1	.....	2	.....
Phys. 7	General Physics .....	5	1	4	2

\* If Econ. 54-55 cannot be scheduled, Econ. 20, 25, and 26 may be substituted.

§ Mechanical engineering students substitute M.E. 171 for B.A. 89 and replace the latter with an approved business course, preferably B.A. 180C. Credit will not be given for both M.E. 171 and B.A. 89.

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Aero.E. 2	Aircraft and Auto Engines.....	3	1	2	2
Econ. 9	General Economics.....	3	3	.....	.....
M.&M. 25	Calculus II: Integral.....	5	5	.....	.....
M.E. 13	Forging and Welding.....	2	.....	2	3
Phys. 8	General Physics.....	5	1	4	2

*Spring Quarter*

Aero.E. 1	Aeronautics.....	3	3	.....	.....
Econ. 28	Business Law.....	3	3	.....	.....
M.&M. 26	Technical Mechanics: Statics.....	5	5	.....	.....
M.E. 5	Pattern Practice.....	2	.....	2	3
Phys. 9	General Physics.....	5	1	4	2

## THIRD YEAR

*Fall Quarter*

Aero.E. 100	Aerodynamics.....	3	3	.....	.....
B.A. 54	Elementary Accounting.....	4	4	.....	.....
M.&M. 128	Strength of Materials.....	5	5	.....	.....
M.&M. 141	Materials Laboratory.....	2	.....	1	2
M.E. 32	Elementary Mechanical Laboratory.....	2	.....	.....	4
M.E. 131	Thermodynamics.....	3	3	.....	.....

*Winter Quarter*

Aero.E. 101	Aerodynamics.....	3	3	.....	.....
B.A. 55	Elementary Accounting.....	4	4	.....	.....
Draw. 28	Drafting.....	2	.....	.....	6
M.E. 18	Machine Shop Practice.....	2	.....	2	3
M.E. 26	Mechanism and Kinematics.....	3	3	.....	.....
M.E. 132	Thermodynamics.....	3	2	1	2

*Spring Quarter*

Aero.E. 102	Aerodynamics.....	3	3	.....	.....
B.A. 58	Elements of Public Finance.....	3	3	.....	.....
B.A. 77	Survey in Marketing.....	3	1	2	.....
Draw. 29	Drafting.....	2	.....	.....	6
M.&M. 127	Technical Mechanics: Dynamics.....	5	5	.....	.....
M.E. 27	Machine Design.....	3	.....	2	3

## FOURTH YEAR

*Fall Quarter*

B.A. 70	Statistics Survey Course.....	3	3	.....	.....
B.A. 167	Personnel Administration.....	3	3	.....	.....
Econ. 161	Labor Problems and Trade Unionism.....	3	3	.....	.....
M.&M. 129	Hydraulics.....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory.....	1	.....	.....	2
M.E. 150	Internal Combustion Engines.....	3	3	.....	.....

*Winter Quarter*

Aero.E. 141	Aerodynamics Laboratory.....	3	1	.....	6
B.A. 112	Business Statistics.....	3	3	.....	.....
B.A. 139	Advanced General Accounting.....	3	3	.....	.....
B.A. 142	Advanced Money and Banking.....	3	3	.....	.....
B.A. 155	Corporation Finance.....	3	3	.....	.....
M.E. 151*	Advanced Internal Combustion Engines.....	4	2	.....	6

\* Only one of the Courses 151 or 154 is required. Students wishing to take M.E. 154 will take Aero.E. 83 in the winter in place of M.E. 151.

## INSTITUTE OF TECHNOLOGY

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Aero.E. 83	Stresses in Simple Structures.....	3	3	.....	.....
Aero.E. 140	Aeronautical Laboratory .....	2	.....	.....	6
Aero.E. 170	Air Transport .....	2	2	.....	.....
B.A. 71	Transportation I: Services and Charges.....	3	3	.....	.....
B.A. 89	Production Management .....	3	3	.....	.....
B.A. 130	Cost Accounting Survey.....	3	3	.....	.....
M.E. 154†	Design of Airplane Engines.....	2	.....	.....	6

## FIFTH YEAR

*Fall Quarter*

Aero.E. 115	Airplane Stresses .....	3	2	.....	2
Aero.E. 120	Airplane Design .....	3	2	.....	2
B.A. 165*	Economics of Public Utilities.....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management.....	3	3	.....	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
E.E. 46	Electric Power .....	3	3	.....	.....

*Winter Quarter*

Aero.E. 121	Airplane Design .....	3	2	.....	2
Aero.E. 190	Seminar .....	1	1	.....	.....
B.A. 101	Advanced General Economics.....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management.....	3	3	.....	.....
E.E. 47	Electric Power .....	3	3	.....	.....
	Optional Course .....	3			

*Spring Quarter*

Aero.E. 122	Airplane Design .....	3	1	.....	6
Aero.E. 155	Aeronautical Calculations .....	2	2	.....	.....
Aero.E. 159	Inspection Trip (spring vacation).....	1	.....	.....	.....
Aero.E. 191	Seminar .....	1	1	.....	.....
B.A. 102	Advanced General Economics.....	3	3	.....	.....
B.A. 165*	Economics of Public Utilities.....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management.....	3	3	.....	.....
M.E. 158	Aero Engine Testing.....	2	.....	.....	6

AGRICULTURAL ENGINEERING WITH  
BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Ag.E. 5	Farm Structures Laboratory.....	3	.....	1	4
Ag.E. 43	Mechanical Laboratory .....	3	.....	1	5
Econ. 8	General Economics .....	3	3	.....	.....
M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Econ. 9	General Economics .....	3	3	.....	.....
M.&M. 25	Calculus II: Integral.....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
Soils 9	Soils .....	4	4	.....	.....

\* May be programmed either in fall or spring quarters.

† Only one of Courses 151 or 154 is required. Students taking M.E. 154 will take Aero.E. 83 in the winter in place of M.E. 151.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Ag.E. 18	Agricultural Automotives .....	4	.....	2	6
Ag.E. 21	Elements of Surveying.....	4	.....	1	9
M.&M. 26	Technical Mechanics: Statics.....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2

## THIRD YEAR

*Fall Quarter*

Ag.E. 52	Elements of Farm Machinery.....	3	1	1	3
Econ. 20	Elements of Accounting.....	3	3	.....	.....
M.&M. 127	Technical Mechanics: Dynamics.....	5	5	.....	.....
M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
M.E. 131	Thermodynamics .....	3	3	.....	.....

*Winter Quarter*

Ag.E. 51 or Soils 108	Land Reclamation .....	5	1	4	.....
B.A. 58	Physical Properties of Soils.....	3	.....	1	6
Econ. 25	Elements of Public Finance.....	3	3	.....	.....
M.&M. 128	Principles of Accounting.....	3	3	.....	.....
M.E. 26	Strength of Materials.....	5	5	.....	.....
	Mechanism and Kinematics.....	3	3	.....	.....

*Spring Quarter*

Ag.E. 37	Rural Sanitation and Water Supply.....	3	.....	3	.....
Ag.E. 53	Farm Structures .....	3	1	1	3
Ag.E. 72 or Ag.E. 73	Applied Electricity .....	3	.....	1	6
Agron. 1	Steam Boilers and Heat Engines.....	3	1	1	3
Econ. 28	General Farm Crops.....	3	3	.....	.....
M.E. 27	Business Law .....	3	3	.....	.....
	Machine Design .....	3	.....	2	3

## FOURTH YEAR

*Fall Quarter*

Ag.E. 67	Advanced Farm Structures Design.....	3	1	1	4
Ag.E. 71	Design and Economics of Agricultural Machinery .....	3	.....	2	3
B.A. 70	Statistics Survey Course .....	3	3	.....	.....
B.A. 71	Transportation I: Services and Charges.....	3	3	.....	.....
B.A. 89	Production Management .....	3	3	.....	.....
C.E. 146	Plain Concrete .....	3	.....	2	4

*Winter Quarter*

Ag.Econ. 102	Farm Management: Organization .....	3	.....	3	.....
Ag.E. 51 or Soils 108	Land Reclamation .....	5	1	4	.....
B.A. 112	Physical Properties of Soils.....	3	.....	1	6
B.A. 142	Business Statistics .....	3	3	.....	.....
Econ. 26	Advanced Money and Banking.....	3	3	.....	.....
	Principles of Accounting .....	3	3	.....	.....

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Ag.E. 72	Applied Electricity .....	3	.....	1	6
or					
Ag.E. 73	Steam Boilers and Heat Engines .....	3	1	1	2
An.Husb. 1	Livestock Production .....	3	.....	3	3
B.A. 130	Cost Accounting Survey .....	3	3	.....	.....
B.A. 139	Advanced General Accounting .....	3	3	.....	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
Econ. 161	Labor Problems and Trade Unionism.....	3	3	.....	.....

## FIFTH YEAR

*Fall Quarter*

B.A. 101	Advanced General Economics .....	3	3	.....	.....
B.A. 167	Personnel Administration .....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management .....	3	3	.....	.....
Geol. 5	Engineering Geology .....	3	.....	3	.....
Rhet. 22	Public Speaking .....	3	3	.....	.....

*Winter Quarter*

B.A. 102	Advanced General Economics .....	3	3	.....	.....
B.A. 165	Economics of Public Utilities .....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management .....	3	3	.....	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
G.E. 101	Contracts and Specifications .....	3	.....	3	.....

*Spring Quarter*

B.A. 77	Survey in Marketing .....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management .....	3	3	.....	.....
C.E. 37	Structural Engineering .....	3	.....	2	4
Dy.Husb. 1	Elements of Dairying .....	3	.....	3	.....

## CHEMICAL ENGINEERING WITH BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Econ. 8	General Economics .....	3	3	.....	.....
Inorg.Chem. 13	Qualitative Analysis .....	5	1	2	8
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Anal.Chem. 1	Quantitative Analysis .....	5	1	1	10
Econ. 9	General Economics .....	3	3	.....	.....
M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

Anal.Chem. 2	Quantitative Analysis .....	5	1	1	10
Chem.E. 80	Chemical Engineering Materials .....	1	.....	2	.....
Econ. 28	Business Law .....	3	3	.....	.....
M.&M. 84	Technical Mechanics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2

## THIRD YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
B.A. 54*	Elementary Accounting .....	4	4	.....	.....
Chem.E. 101	Unit Operations .....	3	2	2	.....
Chem.E. 105	Fuels and Combustion .....	4	2	2	4
German 24	Chemical German .....	3	3	.....	.....
Org.Chem. 51	Organic Chemistry .....	5	.....	5	6

*Winter Quarter*

B.A. 55*	Elementary Accounting .....	4	4	.....	.....
Chem.E. 102	Unit Operations .....	6	4	2	4
German 25	Chemical German .....	3	3	.....	.....
Org.Chem. 52	Organic Chemistry .....	5	.....	5	6

*Spring Quarter*

B.A. 77	Survey in Marketing .....	3	1	2	.....
Chem.E. 103	Unit Operations .....	6	4	2	4
German 26	Chemical German .....	3	3	.....	.....
Org.Chem. 153	Organic Chemistry .....	5	.....	5	6

## FOURTH YEAR

*Fall Quarter*

B.A. 70	Statistics Survey Course .....	3	3	.....	.....
B.A. 101	Advanced General Economics .....	3	3	.....	.....
M.&M. 85	Strength of Materials .....	3	3	.....	.....
M.&M. 87	Materials Testing Laboratory .....	1	.....	.....	2
Met. 152	Metallography .....	3	.....	2	2
Phys.Chem. 101	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 104	Physical Chemistry Laboratory .....	2	1	.....	5

*Winter Quarter*

B.A. 102	Advanced General Economics .....	3	3	.....	.....
B.A. 112	Business Statistics .....	3	3	.....	.....
Econ. 161	Labor Problems and Trade Unionism .....	3	3	.....	.....
M.E. 38	Heat Engines .....	3	1	2	.....
M.E. 39	Heat Engines Laboratory .....	1	.....	.....	3
Phys.Chem. 102	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 105	Physical Chemistry Laboratory .....	2	1	.....	5

*Spring Quarter*

B.A. 130	Cost Accounting Survey .....	3	3	.....	.....
B.A. 165	Economics of Public Utilities .....	3	3	.....	.....
Chem.E. 131	Industrial Inorganic Chemistry .....	4	1	4	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
Phys.Chem. 103	Physical Chemistry .....	3	1	3	.....
Phys.Chem. 106	Physical Chemistry Laboratory .....	2	1	.....	5

*Summer Session*

Chem.E. 151-152	Chemical Manufacture .....	6	.....	.....	.....
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\* Students may take Econ. 20, 25, and 26, in place of B.A. 54 and 55.

## INSTITUTE OF TECHNOLOGY

## FIFTH YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
B.A. 71	Transportation I: Services and Charges .....	3	3	.....	.....
B.A. 89*	Production Management .....	3	3	.....	.....
or					
Chem. E. 121*	Chemical Engineering Economics .....	3	.....	3	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management .....	3	3	.....	.....
Chem.E. 132	Industrial Organic Chemistry .....	3	1	4	.....
E.E. 43	Electric Power .....	3	.....	2	2

*Winter Quarter*

B.A. 58	Elements of Public Finance .....	3	3	.....	.....
B.A. 142	Advanced Money and Banking .....	3	3	.....	.....
B.A. 167	Personnel Administration .....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management .....	3	3	.....	.....
Chem.E. 117	Chemical Engineering Equipment Design .....	3	2	1	4
E.E. 37 or 44	Electric Power .....	3	.....	2	2

*Spring Quarter*

B.A. 139	Advanced General Accounting .....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management .....	3	3	.....	.....
Chem.E. 118	Chemical Engineering Equipment Design .....	3	2	1	4
Chem.E. 187	Chemical Engineering Trip (spring vacation) .....	2	.....	.....	.....
E.E. 45	Electric Power .....	3	.....	2	2

## CIVIL ENGINEERING WITH BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
C.E. 11	Surveying .....	3	1	.....	7
Draw. 21	Drafting .....	2	.....	.....	6
Econ. 8	General Economics .....	3	3	.....	.....
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

C.E. 12	Surveying .....	3	1	.....	7
Draw. 22	Structural Detailing .....	2	.....	.....	6
Econ. 9	General Economics .....	3	3	.....	.....
M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

C.E. 13	Surveying .....	3	1	.....	7
Draw. 23	Structural Detailing .....	2	.....	.....	6
Econ. 28	Business Law .....	3	3	.....	.....
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2

## THIRD YEAR

*Fall Quarter*

C.E. 14	Surveying .....	3	.....	.....	8
C.E. 31	Stresses in Structures .....	2	.....	2	2
C.E. 51	Highways and Pavements .....	3	.....	2	3
Econ. 54	Elementary Accounting .....	4	4	.....	.....
M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2

\* Students will receive credit for only one of these courses.



*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
C.E. 15	Surveying .....	2	.....	4	.....
C.E. 21	Railway Engineering .....	2	1	.....	4
C.E. 32	Stresses in Structures .....	3	.....	2	2
C.E. 52	Highways and Pavements .....	3	1	1	4
Econ. 55	Elementary Accounting .....	4	4	.....	.....
M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2

*Spring Quarter*

C.E. 16	Surveying .....	2	.....	2	4
C.E. 22	Railway Engineering .....	2	1	.....	4
C.E. 33	Elementary Structural Design .....	4	.....	2	6
C.E. 53	Civil Engineering Practice .....	3	1	2	.....
B.A. 77	Survey in Marketing .....	3	1	2	.....
M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....

## FOURTH YEAR

*Fall Quarter*

B.A. 70	Statistics Survey Course .....	3	3	.....	.....
C.E. 121	Railway Engineering .....	3	.....	1	6
C.E. 146	Plain Concrete .....	3	.....	2	4
C.E. 161	Power .....	4	.....	2	6
Econ. 161	Labor Problems and Trade Unionism .....	3	3	.....	.....

*Winter Quarter*

B.A. 58	Elements of Public Finance .....	3	3	.....	.....
B.A. 112	Business Statistics .....	3	3	.....	.....
B.A. 142	Advanced Money and Banking .....	3	3	.....	.....
B.A. 167	Personnel Administration .....	3	3	.....	.....
C.E. 162	Water Supply and Sewerage .....	3	.....	2	4
M.E. 42	Power .....	4	2	2	.....

*Spring Quarter*

B.A. 71	Transportation I: Services and Charges .....	3	3	.....	.....
B.A. 89	Production Management .....	3	3	.....	.....
B.A. 130	Cost Accounting Survey .....	3	3	.....	.....
C.E. 163	Water Supply and Sewerage .....	3	.....	2	5
E.E. 42	Power .....	3	3	.....	.....

*Summer Session*

C.E. 23	Summer Camp .....	9	.....	.....	.....
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## FIFTH YEAR

*Fall Quarter*

B.A. 101	Advanced General Economics .....	3	3	.....	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management .....	3	3	.....	.....
C.E. 130	Statically Indeterminate Structures .....	3	.....	2	2
C.E. 141	Reinforced Concrete .....	3	.....	2	2

## INSTITUTE OF TECHNOLOGY

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
B.A. 102	Advanced General Economics .....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management .....	3	3	.....	.....
C.E. 131	Analysis of Bridges and Buildings.....	2	.....	2	2
C.E. 142	Reinforced Concrete Design.....	3	.....	2	2
C.E. 109	Cadastral Surveying .....	2	.....	2	.....
or					
C.E. 124	Transportation .....	3	3	.....	.....
or					
C.E. 147	Foundations .....	2	.....	2	.....
or					
C.E. 156	Highway Transport .....	3	.....	3	.....
G.E. 101	Contracts and Specifications .....	3	.....	3	.....

*Spring Quarter*

B.A. 139	Advanced General Accounting .....	3	3	.....	.....
B.A. 165	Economics of Public Utilities.....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management.....	3	3	.....	.....
C.E. 132	Design of Bridges and Buildings.....	2	.....	1	3
C.E. 137	Structural Laboratory .....	2	.....	1	3
Econ. 149	Business Cycles .....	3	3	.....	.....

## ELECTRICAL ENGINEERING WITH BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Econ. 8	General Economics .....	3	3	.....	.....
E.E. 11	Elements of Electrical Engineering.....	3	2	1	.....
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Econ. 9	General Economics .....	3	3	.....	.....
E.E. 13	Elements of Electrical Engineering.....	3	2	1	.....
E.E. 14	Elements of Electrical Engineering Laboratory	1	.....	.....	2
M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

Econ. 28	Business Law .....	3	3	.....	.....
E.E. 15	Elements of Electrical Engineering.....	3	2	1	.....
E.E. 16	Elements of Electrical Engineering Laboratory	1	.....	.....	2
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2

## THIRD YEAR

*Fall Quarter*

Econ. 54	Elementary Accounting .....	4	4	.....	.....
E.E. 111	Electrical Engineering .....	5	5	.....	.....
E.E. 112	Electrical Engineering Laboratory .....	2	.....	.....	4
M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Econ. 55	Elementary Accounting .....	4	4	.....	.....
E.E. 113	Electrical Engineering .....	3	3	.....	.....
E.E. 114	Electrical Engineering Laboratory .....	1	.....	.....	2
E.E. 117	Engineering Electronics .....	3	2	.....	2
M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....

*Spring Quarter*

Econ. 161	Labor Problems and Trade Unionism .....	3	3	.....	.....
E.E. 115	Electrical Engineering .....	3	3	.....	.....
E.E. 116	Electrical Engineering Laboratory .....	1	.....	.....	2
E.E. 119	Engineering Electronics .....	3	2	.....	2
M.&M. 128	Strength of Materials .....	5	5	.....	.....

## FOURTH YEAR\*

*Fall Quarter*

B.A. 70	Statistics Survey Course .....	3	3	.....	.....
B.A. 77	Survey in Marketing .....	3	3	.....	.....
B.A. 142	Advanced Money and Banking .....	3	3	.....	.....
E.E. 121	Electrical Engineering .....	3	3	.....	.....
E.E. 122	Electrical Engineering Laboratory .....	2	.....	.....	4

*Winter Quarter*

B.A. 58	Elements of Public Finance .....	3	3	.....	.....
B.A. 112	Business Statistics .....	3	3	.....	.....
B.A. 167	Personnel Administration .....	3	3	.....	.....
E.E. 123	Electrical Engineering .....	3	3	.....	.....
E.E. 124	Electrical Engineering Laboratory .....	2	.....	.....	4

*Spring Quarter*

B.A. 71	Transportation I: Services and Charges .....	3	3	.....	.....
B.A. 89	Production Management .....	3	3	.....	.....
B.A. 130	Cost Accounting Survey .....	3	3	.....	.....
E.E. 125	Electrical Engineering .....	3	3	.....	.....
E.E. 126	Electrical Engineering Laboratory .....	2	.....	.....	4

## FIFTH YEAR

## COMMUNICATION OPTION\*

*Fall Quarter*

B.A. 139	Advanced General Accounting .....	3	3	.....	.....
B.A. 165	Economics of Public Utilities .....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management .....	3	3	.....	.....
E.E. 161	Radio Communication .....	3	.....	2	3
E.E. 164	Electric Communication .....	4	.....	2	4

*Winter Quarter*

B.A. 101	Advanced General Economics .....	3	3	.....	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management .....	3	3	.....	.....
E.E. 162	Radio Communication .....	3	.....	2	3
E.E. 165	Electric Communication .....	4	.....	2	4

\* Students choosing the Communication Option must begin E.E. 64-65-66 in the fourth year.

## INSTITUTE OF TECHNOLOGY

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
B.A. 102	Advanced General Economics.....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management.....	3	3	.....	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
E.E. 100	Inspection Trip (spring vacation).....	2	.....	.....	.....
E.E. 163	Radio Communication .....	3	.....	2	3
E.E. 166	Electric Communication .....	4	.....	2	4

## POWER OPTION

*Fall Quarter*

B.A. 139	Advanced General Accounting.....	3	3	.....	.....
B.A. 165	Economics of Public Utilities.....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management.....	3	3	.....	.....
E.E. 141	Central Stations .....	3	3	.....	.....
M.E. 40	Heat Engines .....	3	2	.....	3

*Winter Quarter*

B.A. 101	Advanced General Economics.....	3	3	.....	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management.....	3	3	.....	.....
E.E. 142	Electrical Transmission .....	3	3	.....	.....
M.E. 41	Heat Engines .....	3	2	.....	3

*Spring Quarter*

B.A. 102	Advanced General Economics.....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management.....	3	3	.....	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
E.E. 100	Inspection Trip (spring vacation).....	2	.....	.....	.....
E.E. 143	Valuation of Public Utilities Properties.....	3	3	.....	.....
M.E. 55	Internal Combustion Engines.....	3	2	.....	3

## MECHANICAL ENGINEERING WITH BUSINESS ADMINISTRATION

## SECOND YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Econ. 8	General Economics .....	3	3	.....	.....
M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
M.E. 9	Foundry Practice .....	2	.....	2	3
M.E. 20	Elementary Machine Design.....	2	.....	.....	6
M.E. 70	Mechanical Technology .....	1	.....	2	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Econ. 9	General Economics .....	3	3	.....	.....
M. & M. 25	Calculus II: Integral.....	5	5	.....	.....
M.E. 5	Pattern Practice .....	2	.....	2	3
M.E. 50	Auto and Airplane Engines.....	3	3	.....	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

Econ. 28	Business Law .....	3	3	.....	.....
M.E. 13	Forging and Welding.....	2	.....	2	3
M.E. 21	Kinematics .....	2	.....	.....	6
M.&M. 26	Technical Mechanics: Statics.....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2

THIRD YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Econ. 54	Elementary Accounting .....	4	4	.....	.....
M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
M.E. 22	Mechanism .....	3	3	.....	.....
M.E. 33	Elementary Mechanical Laboratory.....	2	.....	1	3
M.E. 71	Machine Shop Practice.....	2	.....	2	3
M.E. 131	Thermodynamics .....	3	3	.....	.....

*Winter Quarter*

Econ. 55	Elementary Accounting .....	4	4	.....	.....
M.&M. 128	Strength of Materials.....	5	5	.....	.....
M.E. 23	Dynamics of Machine Design.....	3	.....	.....	6
M.E. 34	Mechanical Laboratory .....	2	.....	1	3
M.E. 72	Machine Shop Practice.....	2	.....	2	3
M.E. 132	Thermodynamics .....	3	3	.....	2

*Spring Quarter*

B.A. 58	Elements of Public Finance.....	3	3	.....	.....
M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
M.E. 24	Elements of Machine Design.....	3	2	.....	3
M.E. 35	Elementary Steam and Power Laboratory.....	2	.....	1	3
M.E. 141	Heat-Power Engineering .....	3	3	.....	.....

FOURTH YEAR

*Fall Quarter*

B.A. 70	Statistics Survey Course.....	3	3	.....	.....
B.A. 89‡	Production Management .....	3	3	.....	.....
B.A. 180C	Senior Topics: Marketing .....	3	3	.....	.....
M.E. 142 or	Heat-Power Engineering .....	3	3	.....	.....
M.E. 150	Internal Combustion Engines.....	3	3	.....	.....
M.E. 171‡	Production Control .....	3	3	.....	.....
M.E. 160	Heating and Ventilation.....	3	1	2	.....
M.E. 159† or	Internal Combustion Engine Laboratory.....	2	.....	.....	4
M.E. 169† or	Heating and Ventilation Laboratory.....	2	.....	.....	4
M.E. 174†	Motion and Time Study Laboratory.....	2	.....	1	3

*Winter Quarter*

B.A. 77	Survey in Marketing.....	3	3	.....	.....
B.A. 112	Business Statistics .....	3	3	.....	.....
B.A. 167	Personnel Administration .....	3	3	.....	.....
Engl. 37	Technical Discussions .....	3	3	.....	.....
M.E. 122* or	Mechanical Engineering Design.....	2	.....	.....	6
M.E. 147*	Design of Steam Machinery.....	2	.....	.....	6
M.E. 142 or	Heat-Power Engineering .....	3	3	.....	.....
M.E. 150	Internal Combustion Engines.....	3	3	.....	.....
M.E. 149† or	Advanced Steam Laboratory .....	2	.....	.....	4
M.E. 159† or	Internal Combustion Engine Laboratory.....	2	.....	.....	4
M.E. 169† or	Heating and Ventilation Laboratory.....	2	.....	.....	4
M.E. 174†	Motion and Time Study Laboratory.....	2	.....	1	3

\* See page 70.

† See page 70.

‡ Mechanical engineers take either M. E. 171, Production Control, or B. A. 89, Production Management and substitute some approved 3-credit business course, preferably B. A. 180C. Credit will not be given for both B. A. 89 and M. E. 171.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
B.A. 71	Transportation I: Services and Charges.....	3	3	.....	.....
B.A. 130	Cost Accounting Survey.....	3	3	.....	.....
B.A. 142	Advanced Money and Banking.....	3	3	.....	.....
Econ. 161	Labor Problems and Trade Unionism.....	3	3	.....	.....
G.E. 193	Engineering Practice .....	2	1	1	.....
M.E. 123* or M.E. 148*	Mechanical Engineering Design.....	2	.....	.....	6
M.E. 149† or M.E. 159† or M.E. 169† or M.E. 174†	Design of Power Plant Units.....	2	.....	.....	6
	Advanced Steam Laboratory.....	2	.....	.....	4
	Internal Combustion Engine Laboratory.....	2	.....	.....	4
	Heating and Ventilation Laboratory.....	2	.....	.....	4
	Motion and Time Study Laboratory.....	2	.....	1	3

## FIFTH YEAR

*Fall Quarter*

B.A. 101	Advanced General Economics.....	3	3	.....	.....
B.A. 155	Corporation Finance .....	3	3	.....	.....
B.A. 180	Senior Topics: Production Management.....	3	3	.....	.....
E.E. 36	Electric Power .....	3	2	.....	2
M.E. 149† or M.E. 159† or M.E. 169† or M.E. 174†	Advanced Steam Laboratory.....	2	.....	.....	4
	Internal Combustion Engine Laboratory.....	2	.....	.....	4
	Heating and Ventilation Laboratory.....	2	.....	.....	4
	Motion and Time Study Laboratory.....	2	.....	.....	4
M.E. 190	Seminar .....	1	1	.....	.....

*Winter Quarter*

B.A. 102	Advanced General Economics.....	3	3	.....	.....
B.A. 139	Advanced General Accounting.....	3	3	.....	.....
B.A. 181	Senior Topics: Production Management.....	3	3	.....	.....
E.E. 37	Electric Power .....	3	2	.....	2
M.E. 156 or M.E. 161 M.E. 191	Design of Internal Combustion Engines.....	2	.....	.....	6
	Heating, Ventilation and Air Conditioning.....	2	.....	.....	6
	Seminar .....	1	1	.....	.....

*Spring Quarter*

B.A. 165	Economics of Public Utilities.....	3	3	.....	.....
B.A. 182	Senior Topics: Production Management.....	3	3	.....	.....
Econ. 149	Business Cycles .....	3	3	.....	.....
E.E. 38	Electric Power .....	3	2	.....	2
M.E. 157 or M.E. 162 M.E. 192 M.E. 195	Design of Internal Combustion Engines.....	2	.....	.....	6
	Heating, Ventilation and Air Conditioning.....	2	.....	.....	6
	Seminar .....	1	1	.....	.....
	Inspection Trip (spring vacation).....	1	.....	.....	.....

\* Students electing Mechanical Engineering Design or Steam Design can program these courses in this year only. Those wishing to elect Internal Combustion Engines or Heating and Ventilation Design can program them in the fifth year.

† Three of the four laboratories are required. One each of these laboratories will program in the fall, winter, and spring quarter of the fourth year and in the fall quarter of the fifth year.

## ENGINEERING PREBUSINESS

(Four-year course in Engineering and Business Administration)

This course has been arranged for students who wish to prepare for positions in industry for which basic technical training is necessary, with instruction in business administration. Such positions are found in fields of purchasing, sales and sales promotion, cost accounting, employment and rate setting, and production control.

Upon the completion of two years of prescribed work in the Institute of Technology the student transfers to the School of Business Administration, where the third and fourth years are taken. The combined course leads to the degree of bachelor of business administration.

Students are required to maintain a "C" average in the School of Business Administration courses.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 91†	Calculus .....	4	4	.....	.....
Phys. 7	General Physics .....	5	1	4	2
Econ. 8	General Economics .....	3	.....	3	.....
M.E. 17	Machine Shop Practice .....	2	.....	2	3
M.E. 70	Mechanical Technology .....	1	.....	2	.....
	Electives*				

*Winter Quarter*

Econ. 3	Elements of Money and Banking .....	5	3	2	.....
Econ. 9	General Economics .....	3	3	.....	.....
Econ. 20¶	Elements of Accounting .....	3	3	.....	.....
Phys. 8	General Physics .....	5	1	4	2
	Electives*				

*Spring Quarter*

M.&M. 84†	Technical Mechanics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
Econ. 5	Elements of Statistics .....	5	5	.....	.....
Econ. 25	Principles of Accounting .....	3	3	.....	.....

## JUNIOR YEAR§

(In the School of Business Administration)

	Credits
Strength of Materials (M.&M. 85f)† .....	3
Materials Testing Laboratory (M.&M. 87f)† .....	1
Principles of Accounting (Econ. 26f,w,s) .....	3
Business Law (Bus. Adm. 51f-52w-53s) .....	9
Business Statistics (Bus. Adm. 112f,w,s) .....	3
Corporation Finance (Bus. Adm. 155f,w,s) .....	3
Advanced Money and Banking (Bus. Adm. 142f,w,s) .....	3
Transportation: Services and Charges I (Bus. Adm. 71f,w,s) .....	3
Survey of Marketing (Bus. Adm. 77f,w,s) .....	3
Production Management (Bus. Adm. 89f,w,s) .....	3
Advanced General Accounting (Bus. Adm. 139f,w,s) .....	3
Tabulating Equipment Laboratory (Bus. Adm. 91f,w,s) .....	1
Electives (See list, page 72) .....	4

\* For list of elective courses in other colleges, see page 88.

† For permissible substitute, see page 87.

¶ Students who have had a high school course or experience in bookkeeping may be exempt from this course and admitted to Econ. 25 by passing a placement test.

§ In addition to the required courses in the junior and senior years, the student must earn approximately 10 credits per year.

## SENIOR YEAR§

(In the School of Business Administration)

	Credits
Transportation: Services and Charges II (Bus.Adm. 72w,s).....	3
Cost Accounting (Bus.Adm. 130f,s).....	3
Advanced General Economics (Bus.Adm. 101f,w,s-102f,w,s).....	6
Business Cycles (Econ. 149f,w,s).....	3
Labor Problems (Econ. 161f,w,s).....	3
Personnel Administration (Bus.Adm. 167f,w).....	3
Public Finance (Bus.Adm. 58f,w,s).....	3
The Economics of Public Utilities (Bus.Adm. 165f,w,s).....	3
Senior Topics: Production Management (Bus.Adm. 180-181-182G).....	9
Electives (See list below).....	12

## ELECTIVES

	Hours
Economic History (Hist. 80f-81w-82s).....	9
Finance Management (Bus.Adm. 156f).....	3
Theory of Statistics (Econ. 113w-114s).....	3
Geography of Commercial Production (Geog. 41f,w,s).....	5
Fire and Marine Insurance (Bus.Adm. 60w).....	3
Casualty Insurance (Bus.Adm. 61s).....	3
Senior Topics: Marketing (Bus.Adm. 180C).....	3
Contracts and Specifications (G.E. 101f,w).....	3

## GEOPHYSICS

The institute has established a curriculum for students interested in geophysics.

It is suggested that any student who desires to enter such a curriculum arrange his programs to include the following courses:

English	Physics
Drawing	General Physics 7-8-9
Chemistry	Intermediate Physics 100-102-104
Mathematics	Theoretical Physics 101-103-105
Algebra, Trigonometry, and Analytics	Modern Exp. Physics 110-112
Differential and Integral Calculus	(individual work)
Differential Equations	Experimental Optics 134
Advanced Calculus	Geophysics
Technical Mechanics (Statics and Dynamics)	Principles of Geophysical Prospecting 161-162
Geology	Elective
General and Historical 1-2, A-B	Paleontology 51
Mineralogy 23-24	Economic Geology 110
Sedimentation 101	Ore Deposits 111
Rock Study 105	Advanced General Geology 151-152-153
Geology of Petroleum 112	Field Work 85
Structural Geology 125	Mining
Map Interpretation 144-145	Mining 131
Field Work 85	Civil Engineering
Elective topics in Mathematical Analysis 144-145-146	Surveying 11-12-13

§ In addition to the required courses in the junior and senior years, the student must earn approximately 10 credits per year.



## MECHANICAL ENGINEERING

Four-year course leading to the degree of bachelor of mechanical engineering, B.M.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The field of mechanical engineering is very broad. Graduates hold positions in technical or nontechnical work in almost every kind of industry.

The profession includes the following major divisions: design of machinery and apparatus for all purposes; production and manufacturing methods; operation of industrial plants; steam power generation, internal combustion engines; heating, ventilation, refrigeration, and air conditioning; mechanical research and development; sales engineering; and the general field of management.

The course is planned to give broad training rather than highly specialized work. A reasonable amount of time is allowed for nontechnical subjects. A course in speech is required.

It is recommended that students in Mechanical Engineering spend their summer vacations in industry if possible.

For freshman year, see page 33.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential .....	5	5	.....	.....
Phys. 7	General Physics .....	5	1	4	2
M.E. 9	Foundry Practice .....	2	.....	1	4
M.E. 20	Elementary Machine Design .....	2	.....	.....	6
M.E. 70	Mechanical Technology .....	1	.....	2	.....
Engl. 37†	Technical Discussions .....	3	3	.....	.....
or					
M.E. 50†	Auto and Airplane Engines .....	3	3	.....	.....
	Electives*				

*Winter Quarter*

M.&M. 25	Calculus II: Integral .....	5	5	.....	.....
Phys. 8	General Physics .....	5	1	4	2
M.E. 5	Pattern Practice .....	2	.....	1	4
Engl. 37†	Technical Discussions .....	3	3	.....	.....
or					
M.E. 50†	Auto and Airplane Engines .....	3	3	.....	.....
	Electives*				

*Spring Quarter*

M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Phys. 9	General Physics .....	5	1	4	2
M.E. 13	Forging and Welding .....	2	.....	1	4
M.E. 21	Kinematics .....	2	.....	.....	6
Engl. 37†	Technical Discussions .....	3	3	.....	.....
or					
M.E. 50†	Auto and Airplane Engines .....	3	3	.....	.....
	Electives*				

\* For list of elective courses in other colleges, see page 88.

† Engl. 37 and M.E. 50 are offered each quarter. Both courses must be completed during the year. Enrolment in Engl. 37 is limited to 25 students.

## INSTITUTE OF TECHNOLOGY

## JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
M.E. 22	Mechanism .....	3	3	.....	.....
M.E. 33	Elementary Mechanical Laboratory .....	2	.....	1	3
M.E. 71	Machine Shop Practice .....	2	.....	2	3
M.E. 131	Thermodynamics .....	3	3	.....	.....
	Electives*				

*Winter Quarter*

M.&M. 128	Strength of Materials .....	5	5	.....	.....
M.&M. 141	Materials Laboratory .....	2	.....	1	2
M.E. 23	Machine Design .....	3	.....	1	6
M.E. 34	Mechanical Laboratory .....	2	.....	1	3
M.E. 72	Machine Shop .....	2	.....	2	3
M.E. 132	Thermodynamics .....	3	3	.....	.....
	Electives*				

*Spring Quarter*

M.&M. 129	Hydraulics .....	4	3	1	.....
M.&M. 143	Hydraulics Laboratory .....	1	.....	.....	2
M.E. 24	Machine Design .....	3	2	.....	3
M.E. 35	Elementary Steam and Power Laboratory.....	2	.....	1	3
M.E. 141	Heat-Power Engineering .....	3	3	.....	.....
	Electives*				

## SENIOR YEAR

*Fall Quarter*

M.E. 121	General Engineering Design .....	2	.....	.....	6
M.E. 142§	Heat-Power Engineering .....	3	3	.....	.....
M.E. 150§	Internal Combustion Engines .....	3	3	.....	.....
M.E. 171§	Production Control .....	3	3	.....	.....
	Senior Laboratory† .....	2	.....	.....	4
M.E. 160	Heating and Ventilation .....	3	1	2	.....
M.E. 190	Seminar .....	1	1	.....	.....
E.E. 36	Electric Power .....	3	2	.....	2
	Electives*				

*Winter Quarter*

M.E. 142§	Heat-Power Engineering .....	3	3	.....	.....
M.E. 150§	Internal Combustion Engines .....	3	3	.....	.....
M.E. 171§	Production Control .....	3	3	.....	.....
	Senior Laboratory† .....	2	.....	.....	4
M.E. 191	Seminar .....	1	1	.....	.....
	Engineering Design¶ .....	2	.....	.....	6
E.E. 37	Electric Power .....	3	2	.....	2
	Electives*				

\* For list of elective courses in other colleges, see page 88.

† Three of the four laboratory courses, M.E. 149, 159, 169, 174, must be taken in the three quarters and not more than two in any one quarter.

§ Courses M.E. 142, 150, 171 must be taken in the fall and winter quarters. Each course is offered both quarters.

¶ The following courses are accepted for this requirement: M.E. 122w-123s, Mechanical Engineering Design; M.E. 147w, Design of Steam Machinery; M.E. 148s, Design of Power Plant Units; M.E. 156w, 157s, Design of Internal Combustion Engines; M.E. 161w, 162s, Heating and Ventilation Design; M.E. 170s, Tool Design and Construction; M.E. 172w, Industrial Plant Design; C.E. 37s, Structural Engineering.

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.E. 192	Seminar .....	1	.....	1	1
	Engineering Design   .....	2	.....	.....	6
M.E. 195	Inspection Trip (spring vacation).....	1	.....	.....	.....
E.E. 38	Electric Power .....	3	2	.....	2
G.E. 193	Engineering Practice .....	2	.....	2	.....
	Senior Laboratory† .....	2	.....	.....	4
	Electives*				

In addition to the regular four-year course in Mechanical Engineering, those who are qualified are urged to take a fifth year, that is, a year of graduate study. This year's work may lead to the Master's degree in mechanical engineering and also satisfy the requirement of graduate study towards the professional degree of mechanical engineer. (For detailed information as to procedure consult the Graduate School Bulletin.)

GEOLOGICAL, MINING, PETROLEUM, AND METALLURGICAL ENGINEERING

(For students entering with chemistry, higher algebra, and solid geometry and who pass their English test.)

FRESHMAN YEARS§

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 11	College Algebra .....	5	5	.....	.....
Inorg.Chem. 4	General Inorganic Chemistry .....	4	1	3	3
Engl. 4	Composition .....	3	3	.....	.....
Draw. 11	Engineering Drawing .....	2	.....	.....	6
Geol. 11	Dynamic Geology .....	2	2	.....	1

*Winter Quarter*

M.&M. 12	Trigonometry .....	5	5	.....	.....
Inorg.Chem. 5	General Inorganic Chemistry .....	4	1	3	3
Engl. 5	Composition .....	3	3	.....	.....
Draw. 12	Engineering Drawing .....	2	.....	.....	6
Geol. 12	Dynamic and Historical Geology.....	2	2	.....	.....

*Spring Quarter*

M.&M. 13	Analytical Geometry .....	5	5	.....	.....
Inorg.Chem. 16	Qualitative Chemical Analysis .....	5	.....	3	6
Engl. 6	Composition .....	3	3	.....	.....
Draw. 13	Topographic Drawing .....	2	.....	.....	6
Geol. 13	Historical Geology .....	2	2	.....	.....

\* For list of elective courses in other colleges, see page 88.

† Three of the four laboratory courses, M.E. 149, 159, 169, 174, must be taken in the three quarters and not more than two in any one quarter.

§ See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in Preparatory English.

¶ The following courses are accepted for this requirement: M.E. 122w-123s, Mechanical Engineering Design; M.E. 147w, Design of Steam Machinery; M.E. 148s, Design of Power Plant Units; M.E. 156w,157s, Design of Internal Combustion Engines; M.E. 161w,162s, Heating and Ventilation Design; M.E. 170s, Tool Design and Construction; M.E. 172w, Industrial Plant Design; C.E. 37s, Structural Engineering.

## GEOLOGICAL, MINING, AND PETROLEUM ENGINEERING

Candidates for either of these degrees need not choose the field of specialization until the beginning of the junior year.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 23	Mineralogy .....	4	1	3	4
M.&M. 31	Calculus .....	3	3	.....	.....
Met. 1	Assaying .....	2	.....	3	.....
Met. 3	Assaying Laboratory .....	1	.....	.....	4
Min. 11	Surveying .....	3	1	3	.....
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Anal.Chem. 9	Quantitative Analysis .....	3	1	1	6
Geol. 24	Mineralogy .....	4	1	3	4
M.&M. 32	Calculus .....	3	3	.....	.....
Min. 12	Surveying .....	3	1	3	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

Geol. 105	Rock Study .....	2	.....	2	2
M.&M. 33	Calculus .....	3	3	.....	.....
Met. 13	General Ferrous Metallurgy .....	2	.....	3	.....
Min. 13	Mine Surveying .....	2	1	2	.....
Min. 14	Surveying Field Work .....	5	.....	.....	20
Min. 120	First Aid (1 week, 3 hours per day).....	0	.....	.....	.....
Phys. 9	General Physics .....	5	1	4	2

*Summer Field Trips*

Min. 15	Field work in surveying on the iron ranges of Minnesota .....	8	.....	.....	.....
Geol. 100	Field work in geology on the iron ranges of Minnesota .....	3	.....	.....	.....

## GEOLOGICAL ENGINEERING

Four-year course leading to the degree of bachelor of geological engineering, B.Geol.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 233 credits.

The course in Geological Engineering is designed to prepare students for responsible positions in geological departments of exploration, oil, or mining companies, or to engage in consulting geological practice.

There are in existence many ore deposits which are economically of no particular value at the present time, either because the cost of mining is excessive or because there is no known method of separating minerals in the mineral aggregate forming the ore at a cost which will result in a profit for the operator. In addition to thoro courses in geology, the mining geologist must, therefore, be familiar with the various methods of mining and know something of the possibilities of ore dressing to recover the valuable minerals. A knowledge of the fundamental principles of the smelting and refining of metals is a decided asset in his work.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, and physics. It must also include plane and mine surveying, mapping, both topographic and geological, assaying, ore dressing, and the principles of metallurgy. The technical work in mining includes exploration, development, and mining methods together with the courses in mine administration, economics of mining, and mining law. The general course in geology is given in the freshman year. Then follow the courses in mineralogy, rock study, and petrography. These are followed by advanced general geology, structural and metamorphic geology, index fossils and paleontology, mineralography, sedimentation, ore deposits, oil geology. Advanced courses in petrology and petrography, blowpipe analysis, and map interpretation are also available.

The Department of Geology is well supplied with working collections of minerals, crystal models, rocks, thin sections, ores and economic minerals, fossils, and other illustrative material used in connection with the courses in paleontology, stratigraphy, and historical geology. The department has large, well-lighted, and fully equipped laboratories for the basic courses of mineralogy, rock study, and petrology. Special equipment is available for studies in sedimentation, rock analysis, and X-ray studies of minerals. Courses in geology and mineralogy extend throughout the four years.

## JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 106	Petrography .....	2	.....	2	2
Geol. 144	Interpretation of Geologic Maps.....	4	.....	.....	8
Geol. 151	Advanced General Geology .....	3	.....	3	.....
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Min. 106	Mine Mapping .....	2	.....	.....	8
Min. 111	Exploration .....	3	.....	4	.....

*Winter Quarter*

Draw. 14	Descriptive Geometry .....	4	.....	3	3
Geol. 124	Metamorphic Geology .....	3	.....	3	.....
Geol. 131	Advanced Petrology .....	4	1	3	4
Geol. 145	Interpretation of Geologic Maps.....	2	.....	.....	4
Geol. 152	Advanced General Geology .....	3	.....	3	.....
Min. 112	Exploration and Development .....	3	.....	4	.....

*Spring Quarter*

Geol. 125	Structural Geology .....	3	.....	3	.....
Geol. 132	Advanced Petrology .....	4	1	3	4
Geol. 153	Advanced General Geology .....	3	.....	3	.....
M.&M. 127	Technical Mechanics: Dynamics.....	5	5	.....	.....
Min. 113	Development and Exploitation .....	3	.....	4	.....

*Summer Field Trip*

Geol. 150	Field Geology. Detailed systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, reports; paragenesis of ores and their relations to geologic structures. Field, Black Hills, South Dakota .....	6	.....	.....	.....
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## INSTITUTE OF TECHNOLOGY

## SENIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 61	Blowpipe Analysis .....	3	.....	2	4
Geol. 91	Index Fossils of North America.....	3	.....	1	4
Geol. 101	Sedimentation .....	3	.....	3	.....
Geol. 110	Economic Geology .....	3	.....	3	.....
Met. 106	Base Metals .....	2	.....	3	.....
Met. 110	Ore Dressing .....	2	.....	3	.....
Min. 141	Reports and Administration .....	3	.....	4	.....

*Winter Quarter*

Geol. 92	Index Fossils of North America.....	3	.....	1	4
Geol. 111	Ore Deposits .....	3	.....	3	.....
Geol. 140	Applied Petrography .....	3	.....	1	4
Geol. 166	Mineralography .....	3	.....	.....	6
Met. 107	Base Metals .....	2	.....	3	.....
Met. 112	Ore Dressing .....	2	.....	3	.....
Min. 142	Coal Mining .....	3	.....	4	.....

*Spring Quarter*

Geol. 93	Index Fossils of North America.....	3	.....	1	4
Geol. 112	Geology of Petroleum .....	3	.....	3	.....
Geol. 141	Applied Petrography .....	3	.....	1	4
Geol. 167	Mineralography .....	3	.....	.....	6
Met. 108	Precious Metals .....	2	.....	3	.....
Met. 116	Ore Dressing Laboratory .....	1	.....	.....	4
Min. 143	Mining Law, Quarries, and Placers.....	3	.....	4	.....

## MINING ENGINEERING

Four-year course leading to the degree of bachelor of mining engineering, B.Min.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 235 credits.

The course in Mining is designed to prepare the student for responsible positions in the field of mining. In such positions a mining engineer, in addition to meeting the technical problems involved in the development and operation of a mine, must be able to pass upon proposals and specifications for structures and for mechanical and electrical equipment. In addition he must be familiar with the fundamental principles of ore dressing and ore testing, as in the early stages of development he must be able to determine whether or not separation of the minerals in the mineral aggregate forming the ore may be made at a cost which will leave a profit to the company.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, physics, and geology including the identification of minerals and rocks. It must also include plane and mine surveying, mapping, assaying, ore dressing, and ore testing. The mechanical and electrical features of the various types of machinery used in the industry must be understood. Tho it is not necessary for the mining engineer to concern himself with problems of the design of individual machines, he must be familiar with the essential characteristics in order to consider intelligently proposals and specifications. Essential to his training is a thoro knowledge of mine exploration and development, mining methods as influenced by the type of deposits, as well as the applications of economics to mining. He must have a reasonable familiarity with the basic mining laws of the various states and the laws governing corporations, etc.

The Department of Mining is well supplied with samples of the smaller mine equipment, models, drawings, photographs, lantern slides, and mine maps. The lectures treat of prospecting, development, support of excavations, mining methods, mine administration, mining law, safety and safety regulations, and the necessary allied subjects. The courses in mining extend through the sophomore, junior, and senior years.

JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 106	Petrography .....	2	.....	2	2
M.&M. 26	Technical Mechanics: Statics.....	5	5	.....	.....
Met. 106	Base Metals .....	2	.....	3	.....
Met. 110	Ore Dressing .....	2	.....	3	.....
Min. 106	Mine Mapping .....	2	.....	.....	8
Min. 111	Exploration .....	3	.....	4	.....
Min. 121	Mine Plant .....	3	.....	5	.....

*Winter Quarter*

Draw. 14	Descriptive Geometry .....	4	.....	3	3
M.&M. 128	Strength of Materials.....	5	5	.....	.....
Met. 107	Base Metals .....	2	.....	3	.....
Met. 112	Ore Dressing .....	2	.....	3	.....
Min. 112	Exploration and Development.....	3	.....	4	.....
Min. 122	Mine Plant .....	3	.....	5	.....

*Spring Quarter*

E.E. 41	Electric Power .....	3	.....	2	3
M.&M. 127	Technical Mechanics: Dynamics.....	5	5	.....	.....
Met. 108	Precious Metals .....	2	.....	3	.....
Met. 116	Ore Dressing Laboratory.....	1	.....	.....	4
Min. 113	Development and Exploitation.....	3	.....	4	.....
Min. 123	Mine Plant .....	3	.....	5	.....
Min. 130	Mine Rescue (1 week, 3 hours per day).....	0	.....	.....	.....
	Electives .....	2	.....	.....	.....

*Summer Field Trip*

Min. 139	Study of mining operations, mine plants, and metallurgical plants in one or more western mining camps .....	6	.....	.....	.....
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SENIOR YEAR

*Fall Quarter*

Geol. 110	Economic Geology .....	3	.....	3	.....
M.E. 9	Foundry Practice .....	2	.....	2	3
Met. 121	Ore Testing .....	2	.....	1	3
Min. 124	Mining Hydraulics .....	4	.....	5	.....
Min. 126	Engineering Construction .....	3	.....	.....	8
Min. 141	Reports and Administration.....	3	.....	4	.....
	Electives .....	2	.....	.....	.....

*Winter Quarter*

Geol. 111	Ore Deposits .....	3	.....	3	.....
M.E. 13	Forging and Welding.....	2	.....	2	3
M.E. 138	General Laboratory .....	2	.....	.....	4
Met. 156	Metallography .....	3	.....	2	3
Min. 127	Engineering Construction .....	3	.....	.....	8
Min. 142	Coal Mining .....	3	.....	4	.....
Min. 144	Advanced Mining .....	3	.....	.....	8

*Spring Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 112	Petroleum Geology .....	3	.....	3	.....
Geol. 125	Structural Geology .....	3	.....	3	.....
M.E. 16	Machine Shop Practice.....	2	.....	2	3
Met. 126	Special Problems in Metallurgy.....	3	2	.....	4
Min. 143	Mining Law, Quarries, and Placers.....	3	.....	4	.....
Min. 145	Advanced Mining .....	3	.....	.....	8
	Electives .....	2	.....	.....	.....

## PETROLEUM ENGINEERING

Four-year course leading to the degree of bachelor of petroleum engineering, B.Pet.E.

Requirements for graduation cover all prescribed courses, including summer field trips and electives, making a total of 235 credits.

The course in Petroleum Engineering is designed to prepare the student for responsible positions in the field of petroleum production. In such a position the petroleum engineer must be familiar with geology and in particular with oil geology. This involves a knowledge of the various geological ages during which oil was formed, of the geological conditions under which the oil was collected in pools, and the methods of interpreting geological data to determine whether or not a given locality may contain such pools. He must know the methods of drilling and the difficulties which must be overcome in this work. He must know the principles of pumping, with both gas lift and mechanical pumps, and the methods of gasoline recovery to be used in connection with these methods. He must know the causes of the formation of emulsions and methods of breaking them when formed. He must be familiar with the laws of flow of viscous fluids and be able to design pipe lines, pumping stations, and storage basins. In addition, he should know the essential economic principles involved in the industry, and be familiar with the forms, contracts, and other documents usual in the industry.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, physics, and geology, including in particular, a thoro familiarity with sedimentary deposits. It must also include surveying and mapping. The mechanical and electrical features of the various types of machinery used in the industry must be understood. A course in pipe lines gives the necessary preparation in flow formulas, soil corrosion, and methods of prevention. Thoro courses are included in prospecting, oil field mapping, production technology, and petroleum economics. Due emphasis is also placed on problems of administration, including reports, leases, contracts, and specifications.

The department is well supplied with samples of the smaller oil field equipment, well logs, drill cores, models, maps, photographs, lantern slides, and samples of petroleum products. The lectures treat of location, prospecting, development, production, refining methods, distribution, administration, leasing, mineral laws, safety work and safety regulations, and allied subjects affecting oil and gas production. Laboratory work includes special problems in oil and gas production. The courses in petroleum engineering subjects extend through the junior and senior years.



## JUNIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 106	Petrography .....	2	.....	2	2
Geol. 144	Interpretation of Geologic Maps .....	3	.....	.....	6
Geol. 151	Advanced General Geology .....	3	.....	3	.....
M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
Min. 121	Mine Plant .....	3	.....	5	.....
Pet.E. 111	Oil Field Development .....	3	.....	4	.....

*Winter Quarter*

Geol. 131	Advanced Petrology .....	4	1	3	4
Geol. 152	Advanced General Geology .....	3	.....	3	.....
M.&M. 128	Strength of Materials .....	5	5	.....	.....
Min. 107	Mine Maps .....	1	.....	.....	3
Min. 122	Mine Plant .....	3	.....	5	.....
Pet.E. 112	Oil Field Production .....	3	.....	4	.....

*Spring Quarter*

Geol. 112	Petroleum Geology .....	3	.....	3	.....
Geol. 125	Structural Geology .....	3	.....	3	.....
M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
Pet.E. 131	Petroleum Refining .....	2	.....	2	.....
Pet.E. 134	Petroleum Plant .....	2	.....	3	.....
Pet.E. 138	Oil Field Mapping .....	2	.....	.....	6
Min. 130	Mine Rescue (1 week, 3 hours per day) .....	0	.....	.....	.....
	Electives .....	2	.....	.....	.....

*Summer Field Trip*

Pet.E. 135	Study of oil well drilling and production methods and refining practice in one or more oil fields .....	6	.....	.....	.....
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## SENIOR YEAR

*Fall Quarter*

Geol. 101	Sedimentation .....	3	.....	3	.....
Geol. 110	Economic Geology .....	3	.....	3	.....
Min. 124	Mining Hydraulics .....	4	.....	5	.....
Min. 126	Engineering Construction .....	3	.....	.....	8
Min. 141	Reports and Administration .....	3	.....	4	.....
Pet.E. 152	Petroleum Production Technology .....	3	.....	1	6

*Winter Quarter*

Geol. 111	Ore Deposits .....	3	.....	3	.....
M.E. 13	Forging and Welding .....	2	.....	2	3
Met. 156	Metallography .....	3	.....	2	3
Min. 127	Engineering Construction .....	3	.....	.....	8
Pet.E. 144	Advanced Petroleum Engineering .....	5	.....	4	6
Pet.E. 153	Petroleum Production Technology .....	3	.....	1	6

*Spring Quarter*

Geol. 153	Advanced General Geology .....	3	.....	3	.....
M.E. 16	Machine Shop Practice .....	2	.....	2	3
Pet.E. 145	Advanced Petroleum Engineering .....	5	.....	4	6
Pet.E. 154	Petroleum Production Technology .....	3	.....	1	6
	Electives .....	6	.....	.....	.....

## METALLURGICAL ENGINEERING

Four-year course leading to the degree of bachelor of metallurgical engineering, B.Met.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 222 credits.

Courses in metallurgy are designed to prepare the student for responsible positions in metallurgical industries. The instruction deals with the production and uses of ferrous, nonferrous, and precious metals. Metallurgists are concerned with the preparation of raw materials for smelting, the design and operation of furnaces to convert ores into metals, and the structure and physical properties of metals and alloys.

Representative ores of all the important metals, models and drawings of furnaces, and samples of furnace products are available. Lectures cover the construction and operations of ore dressing and concentrating machinery, together with typical combinations of ore dressing machines. The sequence of physical and chemical changes occurring during smelting, furnace design, fuels, refractories, methods, and efficiency of heat application and control over quality of product are stressed in courses dealing with metallurgical processes.

Laboratories equipped with various types of furnaces are provided so that the students can become familiar with high temperature equipment and conduct experiments demonstrating important features of metallurgical processes.

Metallography is an important branch of metallurgy dealing with the application of metals and alloys. The work relates to internal structures, as studied by the microscope, and to the physical and chemical properties of metals and alloys. A knowledge of metallography is essential in the design and development of new machines and equipment fabricated from metals.

An elaborate and up-to-date file of references and abstracts is available. A large collection of specimens, photomicrographs, and lantern slides covering all types of steels, brasses, bronzes, aluminum alloys, and other industrial alloys is available for study and comparison.

Laboratory courses accompany lecture work. The metallographic laboratory is equipped with the most up-to-date microscopes and apparatus for heat treating and physical and mechanical testing. Practice is obtained in taking photomicrographs.

Two options are open to students in metallurgy. Option A is provided for students specializing in ore dressing and the refining and smelting of nonferrous metals. Option B is for students interested in the production of ferrous metals and the application of all metals.

Students will register for either Option A or Option B at the beginning of the junior year.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Geol. 23	Mineralogy .....	4	1	3	4
M.&M. 31	Calculus .....	3	3	.....	.....
Met. 1	Assaying .....	2	.....	3	.....
Met. 2	Assaying Laboratory .....	3	.....	.....	8
Phys. 7	General Physics .....	5	1	4	2

*Winter Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Anal. Chem. 9	Quantitative Analysis .....	3	1	1	6
Geol. 24	Mineralogy .....	4	1	3	4
M.&M. 32	Calculus .....	3	3	.....	.....
Met. 11	Metallurgy of Pig Iron .....	3	1	3	.....
Phys. 8	General Physics .....	5	1	4	2

*Spring Quarter*

Geol. 105	Rock Study .....	2	.....	2	2
M.&M. 33	Calculus .....	3	3	.....	.....
Met. 12	Metallurgy of Steel .....	3	1	3	.....
Min. 120	First Aid .....	.....	.....	.....	.....
Phys. 9	General Physics .....	5	1	4	2
	Electives .....	5	.....	.....	.....

JUNIOR YEAR

(Students will register for either Option A or Option B.)

*Fall Quarter*

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
A&B	M.&M. 26	Technical Mechanics: Statics .....	5	5	.....	.....
A&B	Met. 106	Base Metals .....	2	.....	3	.....
A&B	Met. 110	Ore Dressing .....	2	.....	3	.....
A&B	Met. 111	Ore Dressing Laboratory .....	1	.....	.....	4
A&B	Min. 121	Mine Plant .....	3	.....	5	.....
A	Geol. 106	Petrography .....	2	.....	2	2
A	Geol. 165	Ore Dressing Microscopy .....	1	.....	.....	3
A	Min. 111	Exploration .....	3	.....	4	.....
B	M.E. 9	Foundry Practice .....	2	.....	2	3
B	Met. 153	Metallography .....	4	.....	3	4

*Winter Quarter*

A&B	M.&M. 128	Strength of Materials .....	5	5	.....	.....
A&B	Met. 107	Base Metals .....	2	.....	3	.....
A&B	Met. 133	Electrometallurgy .....	3	.....	3	3
A&B	Min. 122	Mine Plant .....	3	.....	5	.....
A	Met. 112	Ore Dressing .....	2	.....	3	.....
A	Met. 113	Ore Dressing Laboratory .....	1	.....	.....	4
A	Min. 112	Exploration and Development .....	3	.....	4	.....
B	M.E. 13	Forging and Welding .....	2	.....	2	3
B	Met. 154	Metallography .....	4	.....	3	4

*Spring Quarter*

A&B	E.E. 41	Electric Power .....	3	.....	2	3
A&B	M.&M. 127	Technical Mechanics: Dynamics .....	5	5	.....	.....
A&B	Met. 108	Precious Metals .....	2	.....	3	.....
A&B		Electives .....	3	.....	.....	.....
A	Met. 114	Ore Dressing .....	2	.....	3	.....
A	Met. 115	Ore Dressing Laboratory .....	1	.....	.....	4
A	Min. 113	Development and Production .....	3	.....	4	.....
B	M.E. 16	Machine Shop Practice .....	2	.....	2	3
B	Met. 155	Metallography .....	4	.....	3	4

*Summer Field Trips*

A	Met. 139	Study of metallurgical and mining operations in western mining districts .....	6	.....	.....	.....
B	Met. 175	Study of metallurgical operations in important iron and steel centers .....	6	.....	.....	.....

## SENIOR YEAR

*Fall Quarter*

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
A&B	Met. 121	Ore Testing .....	2	.....	1	3
A&B	Met. 134	Advanced Metallurgy .....	4	.....	3	4
A	Met. 153	Metallurgy .....	4	.....	3	4
A	Min. 125	Metallurgical Hydraulics .....	3	.....	3	.....
A		Electives .....	6	.....		
B	Chem.E. 76	Applied Electrochemistry .....	3	.....	2	4
B	Met. 141	Problems in Ferrous Metallurgy.....	3	.....		9
	or					
B	Met. 166	Advanced Metallurgy Laboratory.....	3	.....		9
B	Met. 163	Advanced Metallurgy .....	3	.....	3	.....
B		Electives .....	4	.....		

*Winter Quarter*

A&B	Met. 135	Advanced Metallurgy .....	4	.....	3	4
A	Met. 122	Ore Testing .....	4	.....	2	8
A	Met. 137	Problems in Nonferrous Metallurgy.....	4	.....	2	8
A	Met. 154	Metallurgy .....	4	.....	3	4
A		Electives .....	3	.....		
B	Chem.E. 77	Applied Electrochemistry .....	3	.....	2	4
B	Met. 142	Problems in Ferrous Metallurgy.....	3	.....		9
	or					
B	Met. 167	Advanced Metallurgy Laboratory.....	3	.....		9
B	Met. 164	Advanced Metallurgy .....	3	.....	3	.....
B		Electives .....	6	.....		

*Spring Quarter*

A&B	Met. 136	Advanced Metallurgy .....	4	.....	3	4
A	Met. 123	Ore Testing .....	4	.....	2	8
A	Met. 138	Problems in Nonferrous Metallurgy.....	4	.....	2	8
A	Met. 155	Metallurgy .....	4	.....	3	4
A		Electives .....	3	.....		
B	Chem.E. 31	Chemistry of Engineering Materials.....	3	.....	3	.....
B	M.&M. 144	Materials Testing Laboratory.....	2	.....		4
B	Met. 143	Problems in Ferrous Metallurgy.....	3	.....		9
	or					
B	Met. 168	Advanced Metallurgy Laboratory.....	3	.....		9
B	Met. 165	Advanced Metallurgy .....	3	.....	3	.....
B		Electives .....	4	.....		

## PHYSICS

Four-year course leading to the degree of bachelor of physics, B.Phys.

The sequence leading to the degree, bachelor of physics, is intended to be sufficiently broad to provide for the needs of those who desire to prepare for the industrial research field or for graduate work in physics as a major. The outline given is only suggestive and is not complete. A total of 207 credits is required.

A student entering this course may take the freshman program outlined for the first year in any of the curricula of the Institute of Technology except that for architecture. Those who maintain a satisfactory average (C or better) during the first year may register in this course.

It is clear that a student having the above objectives must attain an adequate background in mathematics and in chemistry. The work in physics is planned so as to give a greater or lesser contact with theoretical physics and experimental physics, depending upon the special aptitude of the applicant. Any special interest of the applicant may be met by a careful choice of elective courses which meets the ap-

proval of his adviser. The Department of Physics reserves the right to limit the registration in this course to those who have given evidence of being able to profit by it. Those who contemplate registering in the course should consult the chairman of the department.

**General requirements for graduation.**—The student must fulfill the requirements in credits earned (207) and standards of work required for graduation by the Institute of Technology. The student must include as a minimum:

A major in physics of 51 stated credits.

A minor in mathematics of 34 stated credits.

A minor in chemistry of 39 stated credits.

The following is the prescribed curriculum for the physics course. The student should consult his adviser in the choice of electives.

## SOPHOMORE YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 24	Calculus I: Differential.....	5	5	.....	.....
Anal.Chem. 7	Quantitative Analysis.....	4	1	1	8
E.E. 11	Elements of Electrical Engineering.....	3	2	1	.....
Phys. 7	General Physics.....	5	1	4	2

*Winter Quarter*

M.&M. 25	Calculus II: Integral.....	5	5	.....	.....
Org.Chem. 1	Elementary Organic Chemistry.....	4	2	3	4
E.E. 13	Elements of Electrical Engineering.....	3	2	1	.....
E.E. 14	Elements of Electrical Engineering Laboratory.....	1	.....	.....	2
Phys. 8	General Physics.....	5	1	4	2

*Spring Quarter*

Org.Chem. 2	Elementary Organic Chemistry.....	4	2	3	4
E.E. 15	Elements of Electrical Engineering.....	3	2	1	.....
E.E. 16	Elements of Electrical Engineering Laboratory.....	1	.....	.....	2
Phys. 9	General Physics.....	5	1	4	2
Engl. 8	Explorations in Literature.....	3	.....	3	.....

## JUNIOR YEAR

*Fall Quarter*

M.&M. 151	Differential Equations.....	3	3	.....	.....
Phys.Chem. 101	Physical Chemistry.....	3	1	3	.....
Phys.Chem. 104	Physical Chemistry Laboratory.....	2	1	.....	5
Phys. 100	Intermediate Physics.....	3	3	.....	.....
Phys. 107	Modern Physics.....	3	.....	3	.....
Phys. 144	Electrical Measurements.....	3	1	1	4

*Winter Quarter*

M.&M. 152	Calculus III: Special Topics in Advanced Calculus.....	3	3	.....	.....
Phys.Chem. 102	Physical Chemistry.....	3	1	3	.....
Phys.Chem. 105	Physical Chemistry Laboratory.....	2	1	.....	5
Phys. 102	Intermediate Physics.....	3	3	.....	.....
Phys. 109	Modern Physics.....	3	.....	3	.....
	Electives*				

*Spring Quarter*

M.&M. 153	Calculus IV: Special Topics in Advanced Calculus.....	3	3	.....	.....
Phys.Chem. 103	Physical Chemistry.....	3	1	3	.....
Phys.Chem. 106	Physical Chemistry Laboratory.....	2	1	.....	5
Phys. 104	Intermediate Physics.....	3	3	.....	.....
Phys. 111	Modern Physics.....	3	.....	3	.....
	Electives*				

\* For list of elective courses in other colleges, see page 88.

## SENIOR YEAR

*Fall Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Phys. 101	Theoretical Physics .....	5	5	.....	.....
Phys. 134	Experimental Optics .....	4	.....	.....	8
German 24	Chemical German .....	3	4	.....	.....
	Electives*				

*Winter Quarter*

Phys. 103	Theoretical Physics .....	5	5	.....	.....
Phys. 110	Modern Experimental Physics.....	4	.....	.....	8
Phys. 136	Spectrum Analysis .....	4	.....	.....	8
German 25	Chemical German .....	3	4	.....	.....
	Elective*				

*Spring Quarter*

Phys. 105	Theoretical Physics .....	5	5	.....	.....
Phys. 112	Modern Experimental Physics.....	4	.....	.....	8
or					
Elective					
German 26	Chemical German .....	3	4	.....	.....
	Elective*				

## RECOMMENDED ELECTIVES FOR PHYSICS CURRICULUM

Course No.	Title	Credits
Chem.E. 31s	Engineering Materials .....	3
Econ. 3f,w,s	Elements of Money and Banking.....	5
Econ. 8f,w,9w,s	General Economics, per quarter.....	3
Econ. 28f,s	Business Law .....	3
E.E. 111f	Junior Electrical Engineering.....	5
E.E. 113w-115s	Junior Electrical Engineering, per quarter.....	3
Engl. 21f-22w-23s	Introduction to Literature, per quarter.....	5
Engl. 37f-38w-39s	Twentieth-Century Literature, per quarter.....	3
Engl. 52f-53w	The English Novel, per quarter.....	3
Geol. 1f-2w	General Geology .....	6
Geol. Af-Bw	General Geology Laboratory.....	4
Geol. 8f,w,s	Introductory Geology .....	5
Hist. 1f-2w	European Civilization, per quarter.....	5
Hist. 4f-5w-6s	English History .....	9
M.&M. 84s	Technical Mechanics .....	5
M.&M. 154f	Vector Analysis .....	3
M.&M. 155w	Vector Analysis and Dyadics.....	3
M.&M. 156s	Elements of Tensor Analysis.....	3
M.E. 5f,w,s,su-9f,w,s-13f,w,s,su	Shop Practice, per quarter.....	2
Orient. 1f-2w-3s	Man in Nature and Society, per quarter.....	3
Phil. 1f,w,s	Problems of Philosophy.....	5
Phil. 2f,w,s	Logic .....	5
Phil. 3f,w,s	Ethics .....	5
Phil. 50f-51w-52s	General History of Philosophy, per quarter.....	3
Phil. 154	Logic of Science .....	3
Phys. 52w,s	Laboratory Arts .....	3
Phys. 61w	Introduction to Geophysical Prospecting.....	3

\* For list of elective courses in other colleges, see page 88.

Course No.	Title	Credits
Phys. 113w	Intermediate Acoustics .....	3
Phys. 114f-116w-118s	Elementary Physical Investigation, per quarter.....	3
Phys. 124w	Pyrometry .....	3
Phys. 126s	Advanced Heat .....	3
Phys. 134f,w	Experimental Optics .....	3
Phys. 136w,s	Spectrum Analysis .....	3
Phys. 146w	Advanced Electricity Measurements.....	3
Phys. 152s	X Rays .....	3
Phys. 154w	X-Ray Spectroscopy .....	3
Phys. 161f-162w	Principles of Geophysical Prospecting, per quarter.....	3
Phys.Chem. 116f-117w-118s	Advanced Physical Chemistry, per quarter.....	3
Psy. 1f,s-2w,s	General Psychology, per quarter.....	3
Psy. 3s	Psychology Applied to Daily Life.....	3
Zool. 1f-2w-3s	General Zoology .....	10

SUBSTITUTIONS

In order that students whose course of study is irregular may avoid delays on account of program conflicts or other difficulties, the following substitutions will be approved by petition. Additional credits thus earned may be applied as elective credits.

Course	Credits	Substitute Course	Credits
Aero.E. 115	3	M.&M. 180	3
Draw. 7	3	Draw. 1 and 2	6
8	3	3	3
11	2	1	3
12	2	2	3
21	2	28	2
26	2	28	2
28	2	26	2
M.&M. 84	5	M.&M. 26 and 127	10
85	3	128	5
86	3	129 and 143	5
87	1	141	2
91	4	24 and 25	10
92	4	26 or 84	5
93	4	85 or 128	4 or 5
Anal.Chem. 132	3	Anal.Chem. 105	3

## ADDITIONAL ELECTIVE COURSES

For detailed schedules of classes see the programs of the respective departments in the Combined Class Schedule for 1941-42.

Course No.	Title	Credits	Prerequisites
Ast. 11f,s	Descriptive Astronomy .....	5	None
French 1f,w,s-2f,w,s	Beginning French .....	10	None
French 3f,w,s-4f,w,s	Intermediate French .....	10	None
Geog. 11f,w,s	Human Geography .....	5	3rd qtr. fr., soph., jr., sr.; none
Geog. 41f,w,s	Geography of Commercial Production.....	5	Soph., jr., sr.; none
Geol. 8f,w,s	Introductory Geology .....	5	None
Ger. 1f,w,s	Beginning German A.....	5	None
Ger. 2f,w,s	Beginning German B.....	5	Ger. 1 or one year high school German
Ger. 3f,w,s	Beginning German C.....	5	Ger. 3 or two years high school German
Ger. 4f,w,s	Intermediate German .....	5	Ger. 3 or three years high school German
Hist. 1f,w-2w,s-3f,s	European Civilization .....	12	None
Hist. 4f-5w-6s	English History .....	9	None
Hist. 11f-12w-13s	Medieval History .....	9	None (arch. only)
Hist. 20f-21w-22s	American History .....	9	Soph., jr., sr.; none
Italian 1f-2w	Beginning Italian .....	10	None
Jour. 5s	The American Newspaper.....	3	None
Lib.Meth. 1f,w,s	Use of Books and Libraries.....	2	None (fr. and soph. only)
Phil. 2f,w,s	Logic .....	5	Soph., jr., sr.; none
Phil. 153w	Philosophy of Science .....	3	Phil. 2
Phil. 154s	Logic of Science.....	3	Phil. 153
Pol.Sci. 1f,w-2w,s-3s	American Government and Politics.....	9	None
P.M.&P.H. 3f,w,s	Personal Health .....	2	Fr., soph.; none
Psy. 1f,s-2w,s	General Psychology .....	6	None
Psy. 160f	Psychology in Personnel Work.....	3	Psy. 1-2, Econ. 8-9
Soc. 1f,w,s	Introduction to Sociology.....	5	None
Span. 1f,w,s-2f,w,s	Beginning Spanish .....	10	None
Span. 3f,w,s-4f,w,s	Intermediate Spanish .....	10	Spanish 1-2 or two years high school Spanish
Sp. 1f,w-2w,s-3f	Fundamentals of Speech.....	9	Engl. 6
Sp. 5f,w,s-6f,w,s	Fundamentals of Speech.....	10	Engl. 6
Study 1f,w,s	How To Study.....	2	Permission of instructor



## DESCRIPTION OF COURSES

### AERONAUTICAL ENGINEERING

1s—Aeronautics. History. Nomenclature. Resistance of simple bodies. Theory of flight. The airplane and its parts. Constructional details. Performance. 3 cred.; prereq., M.&M. 12. Messrs. Foa, Stillwell, and Von Eschen.

- |                    |                             |
|--------------------|-----------------------------|
| (1) IV MWF; 105A   | (4) III W, V Th, IV S; 105A |
| (2) III TThS; 105A | (5) II TThS; 105A           |
| (3) II MWF; 105A   | (6) VII MTh, VI T; 105A     |

2w—Aircraft and Auto Engines. Principles and types. Electrical systems. Lubrication and cooling. Carburetors. Accessories. (Open only to aeronautical engineers or by petition.) 3 cred.; soph. Messrs. Foa, Ruszaj, Stillwell, and Von Eschen.

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|----------------------|--------------------|
| Lect. (1) I TW; 105A | (4) I MF; 105A     |
| (2) II TS; 105A      | (5) II MW; 105A    |
| (3) VI TF; 105A      | (6) VI MTh; 105A   |
| Lab. (1) I-II F; A   | (4) VII-VIII Th; A |
| (2) III-IV W; A      | (5) VIII-IX M; A   |
| (3) VII-VIII W; A    | (6) VII-VIII T; A  |
| Quiz I S; 335EE      |                    |

3f—Aeronautics. Instruments. Meteorology. Avigation. 3 cred.; prereq., M.&M. 13. Messrs. Foa, Stillwell, and Von Eschen.

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|-------------------|-------------------|
| (1) I MWF; 105A   | (4) VI MThF; 105A |
| (2) VII MWF; 105A | (5) I TThS; 105A  |
| (3) III MTS; 105A | (6) II TThS; 105A |

83w,s—Stresses in Simple Structures. Statically determinate trusses and beams. Graphic statics. Space frameworks. Combined stresses. Airplane wing bracing. Short and long struts. 3 cred.; prereq., M.&M. 128. Messrs. Hughes and Wise.

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|---------------------------|------------------|
| 83w I TThS; 215E          |                  |
| 83s (1) I TS, VI Th; 215E | (2) III MWF; 22E |

100f-101w-102s—Aerodynamics. Atmospheric properties. Fluid mechanics. Stream functions and velocity potential. Motion of body in liquids in three dimensions. Prandtl's wing theory. Dynamic loads, stability, maneuverability, controllability. 3 cred. per qtr.; prereq., 3 and M.&M. 25. Messrs. Boehnlein and Gail.

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|--------------------------|------------------------------|
| 100f (1) III TThS; 110Ex | (3) II TThS; 215Ex           |
| (2) VI MWF; 205E         |                              |
| 101w (1) I TThS; 104E    | (3) II MW, 205E; III S, 215E |
| (2) II TThS; 205E        |                              |
| 102s (1) I MWF; 104E     | (3) III TThS; 110Ex          |
| (2) I TThS; 104E         |                              |

103f-104w-105s—Advanced Aerodynamics. 3 cred. per qtr.; prereq., 102 or special permission. Messrs. Boehnlein and Gail.

115f—Airplane Stresses. Deflection of structures. Theory of statically indeterminate structures. Analysis of fuselage trusses, landing gear, wing beams. Structural details and connections. 3 cred.; prereq., 83. Messrs. Hughes and Wise.

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|--------------------------|----------------------|
| Lect. II TS; 227E        |                      |
| Lab. (1) VIII-IX F; 229E | (2) VII-VIII T; 229E |

116w—Advanced Airplane Stresses. Theory and design of monocoque fuselages. Multispar and unit construction wings. Vibrations. Wing control-surface flutter. Analysis and design of seaplane hulls and floats. 3 cred.; prereq., 115. Messrs. Hughes and Wise.

Lect. II S; 227E  
Lab. VIII-IX M; 229E

120f-121w-122s—Airplane Design. Stress analysis of wings, fuselages, chassis, control surfaces, etc. Specifications. Performance and design calculations. Propellers. 120f, 3 cred.; 121w, 4 cred.; 122s, 3 cred.; prereq., 83, 102, M.&M. 128. Messrs. Akerman, Brush, Foa, Ruszaj, and Stillwell.

120f	Lect. (1) II M, VI W; 105A	(2) IV TS; 105A
	Lab. (1) II-IV W; 201E	(2) II-IV F; 225E
121w	Lect. (1) IV T, III S; 105A	(2) VI W, VII F; 105A
	Lab. (1) II-IV WF; 229E	(3) I-III Th, II-IV S; 225E
	(2) II-IV WF; 225E	
122s	Lect. IV T; 105A	
	Lab. (1) II-IV MF; 225E	(3) I-III ThS; 201E
	(2) II-IV MF; 229E	

123f,w,s\*-124f,w,s\*-125f,w,s\*—Advanced Airplane Design. Problems in airplane design or development. 2 to 5 cred. per qtr.; prereq., 121. Messrs. Akerman and Foa.

126s\*—Propeller Design. Graphical and analytical methods of investigation. 3 cred.; prereq., 120. Mr. Akerman.

127f,w,s\*-128f,w,s\*—Advanced Problems in Airscrew Design. 2 to 5 cred. per qtr.; prereq., 126. Mr. Akerman.

140f,s—Aeronautical Laboratory. Study of airplane parts and their construction. Fittings. Rigging. Inspection and accessories. 2 cred.; prereq., 102. Messrs. Akerman and Ruszaj.

140f	VII-IX MF; 107A	
140s	(1) VII-IX MF; 107A	(3) II-IV TS; 107A
	(2) VII-IX WTh; 107A	(4) III-V M, VII-IX T; 107A

141f,w,s—Aerodynamics Laboratory. Measurement of air flow. Calibration of Pitot tubes and anemometers. Distribution of air pressure on surfaces. Wind tunnel tests of wings, propellers, and airplane models. 3 cred.; prereq. 101 or registration in 101. Messrs. Boehnlein, Gail, Ruszaj, and Von Eschen.

141f	Lect. VI Th; 201Ex	
	Lab. VII-IX TTh; OSL	
141w	Lect. (1) IV S; 201Ex	(2) III T; 201Ex
	Lab. (1) VII-IX TF; OSL	(3) VII-IX M, II-IV F; OSL
	(2) VII-IX WTh; OSL	
141s	Lect. II W; 215Ex	
	Lab. VII-IX MTh; OSL	

155s—Aeronautical Calculations. 2 cred.; prereq., sr.; II T, VI F; 251ME.

159s—Inspection Trip. Various aircraft and aircraft engine manufacturing plants are visited during the spring vacation period. Written report covering this trip will be submitted. Required of seniors in Aeronautical Engineering. 1 cred.

160s—Lighter-Than-Air Craft. Theory and design. Rigid and non-rigid types. Stresses. Performance. 3 cred.; prereq., 83, 102, M.&M. 128. Mr. Piccard.

Lect.	III T, IV S; 251ME	
Lab.	(1) II-IV W; 225E	(2) II-IV W; 229E

\* Enrolment in these courses requires the approval of the professors from whom the courses are to be taken.

- 164s—Problems Relating to the Stratosphere. 3 cred.; prereq., 102; I TThS; 105A. Mr. Piccard.
- 165f,w,s\*—Advanced Aeronautical Laboratory. Research problems in aeronautical engineering requiring laboratory or field research facilities. 2 to 4 cred.; prereq., 140 or 141. Messrs. Akerman and Piccard.
- 170s—Air Transport. Economics. Airports and airways and their equipment. Air commerce rules and regulations. Communication. 2 cred.; prereq., open to jr. and sr. in Aero.E.  
 (1) VII T, III Th; 105A (2) VII WF; 105A
- 173f—Introductory Meteorology. Physics of the air especially as related to meteorological phenomena. Problems of pressure, temperature, and general circulation of the atmosphere. Laboratory work consists of practical applied problems concerning meteorological phenomena. 3 cred.; prereq., jr. or sr.; III TTh; 105A; VII-IX Th; 205A. Messrs. Piccard and .....
- 174w—Airways Meteorology. Study of air mass analysis. Application of the air mass analysis methods and polar front theory to construction and interpretation of synoptic charts for forecasting purposes. Use of thermodynamic diagrams and vertical cross sections. Preparation and analysis of synoptic maps; preparation of working forecasts. Organization and operation of airways meteorological service. Work in observatory for both ground and upper air observations. 4 cred.; prereq., 173; IV M; 105A; II-III M, VII-VIII Th; 205A.
- 175s—Advanced Meteorology. Use of the thermodynamic charts. Construction and use of isentropic charts. Isobaric analysis and weather forecasting procedure based on Pettersen's theory of mathematical forecasting. Special application of forecasting to airline operations; general consideration to long range forecasting; continuous map analysis and forecasting work. 4 cred.; prereq., 174; I MW; 105A; VII-IX MTh; 205A.
- 190w-191s-192f,w,s—Seminar. Readings, reports, conferences, and discussions. 1 cred. per qtr.; prereq., 101. Messrs. Akerman and Piccard.  
 190w (1) VII T; 105A (3) VII W; 105A  
 (2) VII M; 105A  
 191s (1) VI Th; 105A (3) VI M; 105A  
 (2) VI W; 105A  
 192f,w,s Ar
- 193f,w,s\*-194f,w,s\*-195f,w,s\*—Advanced Problems in Aeronautical Engineering. 2 to 5 cred. per qtr.; prereq., sr. or grad. in Aero.E. Messrs. Akerman, Piccard, Robertson, Wise, Boehnlein, Gail, and Foa.
- 201f\*-202w\*-203s\*—Advanced Problems in Aerodynamics. 3 cred. per qtr.; prereq., 102 or special permission. Messrs. Boehnlein and Gail.
- 260s\*—Advanced Airship Stresses. Coplanar and space rigid frameworks. Secondary stresses. Buckling and elastic instability. Framework of dirigibles, gondolas, and cabins. 3 cred.; prereq., 115. Messrs. Hughes and Wise.
- 272f\*-273w\*-274s\*—Research in Aeronautical Engineering. 2 to 5 cred. per qtr. Messrs. Akerman, Piccard, Robertson, Hughes, Wise, and Boehnlein.
- 275f,w,s\*-276f,w,s\*-277f,w,s\*—Advanced Aircraft Engines. An advanced study of aircraft engines and auxiliary equipment, analysis of current developments in aircraft engines, new engine accessories and installations. Theoretical analysis of their effect upon the performance of modern aircraft. 2 to 5 cred. Messrs. Akerman and Robertson.

\* Enrolment in these courses requires the approval of the professors from whom the courses are to be taken.

For additional courses available to aeronautical engineers in:

Internal Combustion Engines see Mechanical Engineering 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 250, and 254.

Aeronautical Communication and Electric Power see Electrical Engineering, 46-47-48.

Advanced Strength of Materials see Mathematics and Mechanics 180, 181, 182, 184, 185, 186, 294, 295, and 296.

### AGRICULTURAL BIOCHEMISTRY

103s—Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, the chemistry of the various constituents of milk and the chemical technology of the manufacture of dairy products. 5 cred.; prereq., Anal. Chem. 1, 2, Org. Chem. 54, 55; VI-IX MWF; 201SnH(UF). Mr. Palmer.

108s—Chemistry of Wheat and Wheat Products. A lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and its conversion into food. 3 cred.; prereq., Org. Chem. 54-55; II MWF; 211SnH(UF). Mr. Geddes.

110s—Flour Laboratory Methods. A laboratory course. Analysis of wheat and its products. Designed to train students for the cereal industry. 3 cred.; prereq., 101-102 or food analysis; VI-IX MWF; 202SnH(UF). Mr. Geddes.

113f,su-114w,su-115s—Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 119-123. 2 cred. per qtr.; prereq., quantitative analysis, reg. in 119-123; VI-VIII T, VII-IX Th; 202, 208SnH(UF). Mr. Sandstrom.

119f—Colloids. Lectures and assigned readings dealing with the colloidal state of matter, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. 3 cred.; prereq., Org. Chem. 153 and one year of either zoology or botany; III MWF; 113SnH(UF). Mr. Gortner.

120w—Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. 3 cred.; prereq., 119; III MWF; 113SnH(UF). Mr. Gortner.

121w—Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. 3 cred.; prereq., 119; II MWF; 113SnH(UF). Mr. Geddes.

122s—The Lipids and Fats. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fat-like compounds. 3 cred.; prereq., 119; III TThS; 113SnH(UF). Mr. Briggs.

123s—Enzymes. Lectures and assigned readings on enzyme action, including the methods of preparation and investigation of enzymes and their function in biological and industrial processes. 3 cred.; prereq., 119; III MWF; 113SnH(UF). Mr. Sandstrom.

### AGRICULTURAL ECONOMICS

102w—Farm Management: Organization. Characteristics of farming as a business; factors determining type of farming; farm tenure and farm selection; farm layout and farm improvements; factors affecting the selection of crops and livestock for a particular farm. 3 cred.; jr., sr.; prereq., 2 or Econ. 8, 9; II TThS; 210HH(UF). Mr. Pond.

- 103s—Farm Management: Operation. Farm budgeting; personal and business factors affecting farm financial success; utilization of labor, power, and equipment; farm management research methods and farm management services. Special problem in farm planning. Field visit to well-managed farms. 3 cred.; jr., sr.; prereq., 102; II TThS; 100HH(UF). Mr. Pond.

AGRICULTURAL ENGINEERING

FARM STRUCTURES

- 5f—Farm Structures Laboratory. Laboratory practice and study of farm building construction with different types of materials. (For professional agricultural engineers only.) 3 cred.; no prereq. Mr. Christopherson.  
 Lect. I MW; 41En(UF)  
 Lab. II MW, I-II F; 48En(UF)
- 37s—Rural Sanitation and Water Supply. Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. 3 cred.; prereq., M.&M. 129; I MWF; 101En(UF). Mr. Tyler.
- 44s—Advanced Drawing. Plans and pictorial drawings, including perspective, charts, graphs, and co-ordinate plotting on various scales. Mapping. Illustrations for publication. 2 cred.; prereq., Draw. 2, or equiv. Mr. Otis.  
 Lect. ar.; 303En(UF)  
 Lab. ar.; 303En(UF)
- 53s—Farm Structures. Planning and economics of farm structures. 3 cred.; prereq., 5, Draw. 3 or equiv. Mr. White.  
 Lect. II TS; 305En(UF)  
 Lab. III-IV TS; 305En(UF)
- 67f—Advanced Farm Structures Design. Planning, estimating, and designing of farm structures. Study of materials and equipment commonly used. 3 cred.; prereq., 5, 53, M.&M. 128. Messrs. White and Otis.  
 Lect. I TTh; 305En(UF)  
 Lab. II TTh, I-II S; 305En(UF)
- 111f-112w-113s—Farm Building Problems. Investigations in building materials, special designs, methods of construction, costs, and efficiency of farm buildings. 2 to 6 cred. per qtr.; sr.; prereq., 67; ar.; 305En(UF). Messrs. White, Christopherson, and Otis.
- 211f-212w-213s—Farm Structures Research. Studies in farm structures as related to other factors in the farm business. 2 to 6 cred. per qtr.; prereq., 111; ar. Mr. White.

FARM POWER AND MACHINERY

- 18s—Agricultural Automotives. Principles of internal combustion engines and tractors including ignition, lubrication, carburetion, cooling, real gas cycles, transmission systems, and drive members. 4 cred.; prereq., Phys. 7. Messrs. Torrance and Strait.  
 Lect. VI TTh; 216En(UF)  
 Lab. VII-IX TTh; 37En(UF)

- 43f—Mechanical Laboratory. Instruction and laboratory practice in mechanical work, embracing rope work, belt lacing, and pulleys; cement work; soldering; welding; pipe fitting; electric wiring. 3 cred.; no prereq.; I-II TThS; 20, 106En(UF). Messrs. Dent and Strait.
- 52f—Elements of Farm Machinery. Principles of development, construction, and use of agricultural machines. Drawbar power. 3 cred.; prereq., M.&M. 26. Mr. Schwantes.  
 Lect. VI TTh; 216En(UF)  
 Lab. VII-IX Th; 49En(UF)
- 71f—Design and Economics of Agricultural Machinery. Machine and power costs of farm operations; operating principles and design problems. 3 cred.; prereq., 18, 52, M.E. 27; VI-IX M; 49 and 105En(UF), VII F; 105En(UF). Messrs. Schwantes and Strait.
- 72s—Applied Electricity. Lectures and laboratory work on topics important in the application of electric power to agriculture, including circuit theory, instruments, farmstead wiring, lighting, motors and controls, and storage batteries. (Offered only in alternate years, 1942-43, etc. Alternate with Ag.E. 73.) 3 cred.; jr., sr.; prereq., Phys. 9 or 43, 44. Mr. Hustrulid.  
 Lect. III MF; 101En(UF)  
 Lab. VI-IX W; 5E En(UF)
- 73s—Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. (Offered only in alternate years, 1941-42, etc. Alternate with Ag.E. 72.) 3 cred.; prereq., M.E. 131 and Ag.E. 18. Mr. Strait.  
 Lect. III MF; 216En(UF)  
 Lab. VI-IX W; 101En(UF)
- 121f-122w-123s—Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm. Tests, design, and adaptability. 2 to 6 cred. per qtr.; prereq., 126; ar. Messrs. Schwantes and Hustrulid.
- 126w—Selection and Management of Agricultural Machinery. Special problems in economical power and machine combinations and their application to the farm. 3 cred.; prereq., 18, 71, Ag.Econ. 102; III MW; 103En(UF); lab. 3 hrs. ar.; 305En(UF). Mr. Schwantes.
- 221f-222w-223s—Farm Power and Machinery Research. Studies involving the design or utilization of power machinery used in connection with farm operation. 2 to 6 cred. per qtr.; prereq., 121; ar. Messrs. Schwantes and Hustrulid.

#### LAND RECLAMATION

- 21s—Elements of Surveying. Use of tape, level, transit, traverse board in differential and profile leveling, cross sectioning, running tangents, and simple curves, topographic and agricultural surveys. Mapping, calculation of earthwork, and adjustments of instruments. 4 cred.; prereq., Draw. 3, M.&M. 12. Messrs. Roe, Manson, and Park.  
 Lect. VI M; 105En(UF)  
 Lab. VII-IX M, VI-VIII WF; 305En(UF)
- 28w—Land Clearing. Land clearing methods, machinery, and care and use of explosives. (Offered only in alternate years, 1941-42, etc.) 2 cred.; no prereq.; I TTh; 105En(UF). Mr. Schwantes.

- 51w—Land Reclamation. Principles and practices of irrigation, land drainage, and soil erosion control in relation to plant growth, farm operation, land development, and community interest. (Offered only in alternate years, 1941-42, etc. Alternate with Soils 108.) 5 cred.; prereq., 21 or reg. in 21, Soils 9, M.&M. 129 and 143 or reg. in M.&M. 129 and 143; VI MTWThF; 105En(UF). Messrs. Roe, Manson, and Park.
- 101f-102w-103s—Advanced Drainage Problems. Special drainage problems including surface run-off, soil permeability, relation of soil and crop type to drainage, shape and regulation of water table in relation to root growth, etc. 2 to 6 cred. per qtr.; prereq., 51; ar.; 105En(UF). Messrs. Roe, Manson, and Park.
- 201f-202w-203s—Reclamation Research. Studies of design and functioning of land reclamation works with special reference to soil types and soil water conditions. 2 to 6 cred. per qtr.; prereq., 101, 102, or 103 and one qtr. Statistics; ar. Mr. Roe.

#### AGRONOMY AND PLANT GENETICS

- 1f,s—Farm Crops. Important field crops of the United States with emphasis upon those of local importance, distribution, economic importance, agricultural classification, cultural methods, and principles of improvement and seed selection. 3 cred.; no prereq.; IV MWF; 211Ag(UF). Mr. Murphy.

#### ANIMAL AND POULTRY HUSBANDRY

- 1f,w,s—Livestock Production. Opportunities and problems in livestock production. A survey of practices followed in the production of beef cattle, sheep, swine, and horses. Lectures and laboratory practice in classifying and appraising livestock. 3 cred.; jr., sr.; no prereq.; I-II MWF, CSt(UF) (f,s); I-II TThS, CSt(UF) (w). Mr. Harvey.

#### ARCHITECTURE

##### HISTORY AND THEORY

- 1f-2w-3s—Introduction to Architecture. Discussions and problems to inform prospective students regarding the nature of architecture as an art and a profession. 1 cred. per qtr.; no prereq.; open only to students in architecture and students majoring in architecture; III W; 320E. Mr. Roy Jones.
- 4f-5w-6s—Graphic Representation. Projections, shades and shadows, perspective and other processes involved in architectural drawing. 2 cred. per qtr.; no prereq.; lect. II S; 320E; III-IV S; 402E. Mr. Heath.
- 51f-52w-53s—History of Architecture. Same as F.A. 51-52-53. The significant architecture of the past, with particular reference to the geographic, social, and technical influences which produced it. 3 cred. per qtr.; prereq., jr. standing; IV MWF; 320E. Mr. Lesley.
- 57f-58w-59s—Building Materials and Methods. Principles, methods, and materials involved in the standard types of building construction. 2 cred. per qtr.; no prereq.; I TTh; 320E. Mr. Heath.
- 61f-62w-63s—Tutorial Work in History of Architecture. Same as F.A. 61-62-63. 2 cred. per qtr.; prereq., 53; ar. Mr. Lesley.
- 67f-68w-69s—Theory of Design. Basic principles of creative composition in space, color, and materials as applied to architectural, industrial, and interior design. 2 cred. per qtr.; prereq., consent of instructor; II TTh; 320E. Mr. Huchthausen.

- 101f-102w-103s—Building Materials and Methods (continued). 2 cred. per qtr.; prereq., 59; III TTh; 320E. Mr. Robert Jones.
- 104f—Housing. Social, economic, political, and technical phases of modern group housing. Intended for mature students in the College of Science, Literature, and the Arts and the Institute of Technology. 3 cred.; prereq., sr. or grad. standing; I MWF; 320E. Messrs. Robert Jones, Anderson, Chapin, Christensen, Filipetti, and Vaile.
- 105w—Professional Practice. Relations of the architect to client, contractor, and fellow-practitioners. Procedures of architectural practice. 2 cred.; prereq., sr. standing; III MF; 320E. Mr. Roy Jones.
- 106s—Housing. Social, economic, political, and technical phases of modern group housing, with special reference to the architects' functions therein. 2 cred.; prereq., sr. standing; III MF; 320E. Mr. Robert Jones.
- 110f—Architectural Acoustics. Principles, methods, and materials involved in the acoustical treatment of buildings. 2 cred.; no prereq.; III MF; 320E. Mr. Pepinsky.

For special courses for architects in structural engineering see Mathematics and Mechanics 91, 92, 93 and Civil Engineering 38, 39, 41.

For special courses for architects in building equipment see Civil Engineering 171, Electrical Engineering 40, and Mechanical Engineering 164.

#### DESIGN

Completion of these courses is dependent on achievement, rather than time. Students will continue their registration until the course is completed and a mark is reported. An acceptable quality of work normally allows a rate of progress as indicated for each course.

#### *Architectural*

The object of the courses in architectural design is to develop the individual student's skill in creative effort as applied to the production of architecture. They provide opportunity for the student to exercise himself in all necessary phases of that creative effort, including especially research, composition, construction, and representation as four essential and interrelated parts of one unified process.

The courses consist of a series of problems, classified into three stages of advancement called grades, and culminating in a thesis whose satisfactory completion is a prerequisite for the degree in architecture. Most problems are done under criticism in which critics representing the several phases involved will collaborate. Certain problems are done entirely without criticism, in order to develop and test more fully the student's own power of independent achievement.

Work in all these courses is carried on simultaneously and continuously. A student may enter or leave them at any time he is judged ready to do so. They are administered by a design committee consisting of the major and consulting critics and Mr. Roy Jones, chairman. See also Statement Concerning Courses in Architectural Design issued by the School of Architecture.

AD-If,w,s‡—Architectural Design, Grade I. 15 cred. (normally 5 cred. per qtr.); no prereq.; hrs. ar., including VI-VIII MTWThF for criticisms; 402E. Major critic, Mr. Cerny (Composition); consulting critics, Mr. Robert Jones (Construction), Mr. Huchthausen (Composition).

‡ A fee of \$2 per quarter is charged for this course.



- AD—IIIf,w,s†—Architectural Design, Grade II. 18 cred. (normally 6 cred. per qtr.); prereq., AD-I; hrs. ar., including VI-VIII MTWThF for criticisms; 302E and 309E. Major critic, Mr. Robertson (Composition); consulting critics, Mr. Heath (Construction), Mr. Huchthausen (Composition).
- AD—IIIIf,w,s†—Architectural Design, Grade III. 45 cred. (normally 9 cred. per qtr.); prereq., AD-II; hrs. ar., including VI-VIII MTWThF for criticisms; 317E. Major critics, Messrs. Arnal and Roy Jones (Composition); consulting critic, Mr. Robert Jones (Construction), Mr. Huchthausen (Composition).
- AD—IVf,w,s††—Architectural Thesis. 12 cred.; prereq., AD-III; hrs. ar., including VI-VIII M for criticisms; 317E. Major critic, Mr. Roy Jones; consulting critics, Mr. Arnal (Composition), Mr. Robert Jones (Construction).

### *Interior*

Problems dealing with the composition, decoration, and furnishing of interiors.

- Arch. ID—If,w,s†—Interior Design. 24 cred. (normally 8 cred. per qtr.); prereq., AD-II; hrs. ar., including VI-VIII MTWThF for criticisms; 309E. Major critic, Mr. Huchthausen.

### *Stage*

Problems dealing with the design of settings and costumes for dramatic productions.

- Arch. SD—If,w—Stage Design. 4 cred. (normally 2 cred. per qtr.); no prereq.; VI-VIII TTh; 405E. Mr. Burton.

### DRAWING, PAINTING, AND MODELING

Completion of these courses is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark is reported. An acceptable quality of work normally allows a rate of progress as indicated for each course.

The object of these courses is to develop student's skill in esthetic expression through the medium of form and color. They consist of studio exercises divided into successive stages of advancement called grades. Work in most of the grades is carried on continuously. A student may enter or leave them at any quarterly interval he is judged ready to do so.

- DP—If,w,s,†††—Drawing and Painting, Grade I. Studies in graphic expression dealing with simpler composition in form and color. 6 cred. (normally 2 cred. per qtr.); no prereq.; sections limited to 30 students. Consult School of Architecture for registration. Mr. Young.

- DP—If (1) II-III MF; 417E  
(2) VI-VII TTh; 417E

- DP—IIIf,w,s,†††—Drawing and Painting, Grade II. Studies in graphic expression dealing especially with composition in color. 6 cred. (normally 2 cred. per qtr.); prereq. DP-I; sections limited to 25 students. Consult School of Architecture for registration. Messrs. Huchthausen and Young.

- (1) II-III TTh; 417E  
(2) VI-VII TTh; 417E

- DP—IIIIf,w,s,†††—Drawing and Painting, Grade III. Studies in graphic expression dealing especially with composition based on the human figure. 6 cred. (normally 2 cred. per qtr.); prereq., DP-II; II-III MW; 417E. Mr. Burton.

† A fee of \$2 per quarter is charged for this course.

†† A fee of \$5 is charged for this course.

††† A fee of \$1 per quarter is charged for this course.

- DP-IV<sub>f,w,s,‡</sub>—Drawing and Painting, Grade IV. Studies in graphic expression dealing especially with advanced figure composition and mural decoration. 6 cred. (normally 2 cred. per qtr.); prereq., DP-III; VI-VIII MW; 405E. Mr. Burton.
- DP-V<sub>f,w,s</sub>—Drawing and Painting, Grade V. For graduate students only. Continuation of DP-IV. 6 cred. (normally 2 cred. per qtr.); prereq., DP-IV or equivalent; hrs. ar.; 417E. Mr. Burton.
- M-If<sub>w,s,‡</sub>—Modeling, Grade I. Studies in plastic expression dealing with simpler compositions. 6 cred. (normally 2 cred. per qtr.); no prereq.; VI-VIII MW; 405E. Mr. Burton.
- M-Iaf<sub>w,s</sub>—Modeling for Architects. Studies in plastic expression as applied to architectural composition. 2 cred.; prereq., reg. in Arch. Design; II-III TTh; 405E. Mr. Burton.
- M-II<sub>f,w,s,‡</sub>—Modeling, Grade II. Studies in plastic expression dealing especially with the human figure. 6 cred. (normally 2 cred. per qtr.); prereq., M-I; VI-VIII MW; 405E. Mr. Burton.
- M-III<sub>f,w,s</sub>—Modeling, Grade III. For graduate students only. Continuation of M-II. 6 cred. (normally 2 cred. per qtr.); prereq., M-II or equivalent; hrs. ar.; 405E. Mr. Burton.
- IHP-If—Illustration. Studies in graphic expression as applied to illustration. 2 cred.; prereq., DP-I; VI-VIII MTh; 417E. Mr. Young.
- IHP-II<sub>w,s</sub>—Hand Print Processes. Studies in graphic expression as applied to engraving, etching, drypoint, and lithograph. 4 cred. (normally 2 cred. per qtr.); prereq., DP-I; VI-VIII MTh; 417E. Mr. Young.

#### ASTRONOMY

- 51w—General Astronomy. A survey course covering the fundamental facts and principles of astronomy. 3 cred.; prereq., M.&M. 12; IV MWF; 133Ph. Mr. Luyten.
- 101f\*—Celestial Mechanics. 3 cred.; prereq., M.&M. 25; II MWF; ar. Mr. Luyten.
- 140f\*—Method of Least Squares. The combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics, astronomy, and psychology. 3 cred.; prereq., 51 or 11 and M.&M. 24; ar. Mr. Luyten.

#### BACTERIOLOGY AND IMMUNOLOGY

- 53f<sub>w,s,su,‡‡</sub>—General Bacteriology. Principles and technique of general bacteriology; studies in the morphologic and biologic characters of the common bacteria; culture media; principles of sterilization and disinfection; examination of air, water, milk, food; relation of bacteriology to the industries. Lectures and laboratory. 5 cred.; prereq., 4 cred. of zoology or botany and Inorg. Chem. 10; VII-IX MWF; MH.
- 103w—Soil Microbiology. Studies of the microscopic inhabitants of the soil. Prereq., 53, and 15 cred. in chemistry; 9 hrs.; 5 cred.; I-III TThS; MH. Dr. Skinner.

\* Courses 101 and 140 are usually offered in alternate years, and only one will be given in each year, depending on the demand.

‡ A fee of \$1 per quarter is charged for this course.

‡‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing \$1.50 microscope card from bursar.

- 104s—Sanitary Bacteriology. Standard and other methods for the bacteriological products. Preparation of standard culture media, technique and evaluating of results. Primarily for major in bacteriology. Limited to 15 students. 4 cred.; prereq., 53 and 15 cred. in chemistry; VI-VII MWF; MH. Dr. Skinner.
- 114s—Molds, Yeasts, and Actinomycetes. 4 cred.; prereq., Bact. 53; 6 hrs.; VII-VIII TTh, III-IV S; MH. Dr. Henrici.
- 121f-122w§—Physiology of Bacteria. Effect of environment on growth; enzymes; food requirements; carbohydrates, protein, and fat metabolism; products of growth; dormancy; death. 6 cred.; prereq., 53 and 8 cred. of organic chemistry or biochemistry; III TThS; MH. Dr. Halvorson.
- 123s—Applied Bacteriology. Industrial fermentations; bacteriology of water and sewage; interpretation of bacteriological data. 3 cred.; prereq., 121-122; III TThS; MH. Dr. Halvorson.
- 203f,w,s—Seminar in Bacteriology. 1 hr.; 1 cred.; IX W; MH. Staff.

## BOTANY

- 1f,w,s—General Botany. Structure, physiology, life histories, and evolution of plants. Lectures and quizzes. 4 cred.; all; no prereq. Mr. Huff.
- |      |                           |              |                    |
|------|---------------------------|--------------|--------------------|
| 1f   | Lect. Bot. Aud.           | (1) III TThS | (2) VI W, VI-VII F |
|      | Quiz Bot. Aud.            | (1) I TTh    | (6) V WTh          |
|      |                           | (2) II TTh   | (7) VI WF          |
|      |                           | (3) III MW   | (8) VI-VII M       |
|      |                           | (4) IV MW    | (9) VII-VIII W     |
|      |                           | (5) IV TS    |                    |
| 1w,s | Lect. III TThS; Bot. Aud. |              |                    |
|      | Quiz Bot. Aud.            | (1) I TTh    | (4) IV TS          |
|      |                           | (2) II TTh   | (5) IV MW          |
|      |                           | (3) III MW   |                    |

## CHEMISTRY

## INORGANIC CHEMISTRY

A fee of \$2 per quarter is charged for Courses 1 to 16, inclusive.‡

- 1f,su-2w—General Inorganic Chemistry (Agr., arch., predent., premed.) Study of the general laws of chemistry and of the nonmetals and metals and their compounds. 4 cred. per qtr.; no prereq. Messrs. Barber and Pervier.
- |       |                        |
|-------|------------------------|
| 1f-2w | (Predent, and premed.) |
|       | Lect. VI MWThF; 225C   |
|       | Quiz VI T; ar. C       |
|       | Lab. VII-IX T; 290C    |
| 1f    | (Agr. and arch.)       |
|       | Lect. VI MWF; 100C     |
|       | Quiz VII F; ar. C      |
|       | Lab. VII-IX M; 210C    |
| 2w    | (Agr. and arch.)       |
|       | Lect. VI MWF; 100C     |
|       | Quiz VII M; ar. C      |
|       | Lab. VII-IX F; 210C    |

‡ The \$2 fee is taken from the \$5 deposit blue card at the beginning of the quarter. This card is purchased from the bursar, first floor, Administration Building. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

§ To receive credit for any part of this course, a student must complete both quarters.

3s—Semimicro Qualitative Analysis. (Agr.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. 4 cred.; prereq., 2. Mr. Barber.

Lect. VII MWF; 325C  
Lab. VIII-IX MW; 210C

4f,su-5w—General Inorganic Chemistry. Study of the general laws of chemistry and of the nonmetals and their compounds. More intensive than Course 1f-2w. 4 cred. per qtr.; prereq., high school chemistry. Messrs. Reyerson, Heisig, and Maynard.

4f (Engrs. and miners)

Lect. IV T, III ThS; 100C  
Lab. (1) I-III T; 110C  
(2) II-IV W; 110C

Quiz VIII F; 100C, 305E  
(3) II-IV F; 110C

Students doing unsatisfactory work in this course will be required to take 2 additional hours; IX TF; 225C.

(Pemed.)

Lect. VII MWF; 325C  
Lab. VII-IX T; 210C

Quiz VI T; 100C

(Preident., med. tech.)

Lect. VII MWF; 225C  
Lab. VII-IX Th; 210C

Quiz VI Th; 100C

5w (Engrs. and miners)

Lect. IV TS, III Th; 100C  
Lab. (1) I-III T; 110C  
(2) II-IV W; 110C

Quiz IX T; 100C, 325C  
(3) II-IV F; 110C

(Pemed.)

Lect. VII MWF; 325C  
Lab. VII-IX T; 210C

Quiz VI T; 100C

(Preident., med. tech.)

Lect. VII MWF; 225C  
Lab. VII-IX Th; 210C

Quiz VI Th; 100C

6f,su-7w—General Inorganic Chemistry. Study of the general laws of chemistry and of nonmetals, metals, and their compounds. 5 cred. per qtr.; no prereq. Miss Cohen.

Lect. II MWF; 410C, I-II T; 100C(f), 325C(w); I Th; 410C  
Lab. § (1) II-III T, I-III Th; 210C (2) I-II ThS, II T; 210C

9f,w,\*su-10w,s—General Inorganic Chemistry. Course 9. Study of general laws of chemistry and of nonmetals and their compounds. More intensive than Courses 6 and 7. Course 10. The metals and their compounds. 5 cred. per qtr.; prereq., one year of high school chemistry. Mr. Sneed, Miss Cohen, and Messrs. Klug and Taylor.

9f-10w Lect. (1) II MWF; 100C (Chem., S.L.A.)  
(2) VII MWF; 100C (Agr.)

9f Lab. (1) I-III ThS; 290C (Chem., S.L.A.)  
(2) I-II TThS; 290C (Chem., S.L.A.)  
(3) VIII-IX MWF; 110C (Agr.)

10w Lab. (1) I-III ThS; 290C (Chem., S.L.A.)  
(2) I-II TThS; 290C (Chem., S.L.A.)  
(3) I-III TTh; 290C (Chem., S.L.A.)  
(4) VIII-IX MWF; 110C (Agr.)

9w\*-10s Lect. (1) III MWF; 325C(w), 225C(s) (2) III MWF; 410C(w), 325C(s)  
Lab. (1) VI-VII MWF; 210C (2) VI-VII MWF; 290C

\* Students who have failed in 1f, 4f, 6f, 9f, or 14f, may register in section 2 for this course without further prerequisite.

§ Freshmen entering the School of Chemistry without credit in high school chemistry must register in this section and for two additional hours; I-II S in both 6 and 7.

11f,s,su†—Semimicro Qualitative Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. 4 cred.; prereq., 2, 5, 7, 10, or 15. Mr. Reyerson, Miss Cohen, and Mr. Pervier.

- 11f Lect. IV MWF; 225C Lab. VI-IX F; 210C  
 11s (Premed., predent., med. tech. who entered without high school chem.)  
 Lect. VI MWF; 225C  
 Lab. VI-IX Th; 290C  
 (Premed., predent., med. tech. who entered with high school chem.)  
 Lect. VII MWF; 100C  
 Lab. (1) VI-IX T; 210C (premed.)  
 (2) VI-IX Th; 210C (prezent., med. tech.)

12f,s,su†-13f,w—Semimicro Qualitative Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, reduction, etc. 5 cred. per qtr.; prereq., 7 or 10. Mr. Sneed, Miss Cohen and Messrs. Heisig and Taylor.

- 12f Lect. I TThS; 325C  
 Lab. I-III MW; 290C  
 12s (Chem., S.L.A. who took Inorg. Chem. 10)  
 Lect. II MWF; 100C  
 Lab. (1) I-III TS; 290C (2) I-III TTh; 290C  
 (Pharm. and others)  
 Lect. II MWF; 325C  
 Lab. (1) I-III TTh; 210C (2) I-II TThS; 210C  
 13f Lect. VI MW; 325C Quiz VI F; 305E  
 Lab. VII-VIII M, VII-IX WF; 290C  
 13w Lect. VI WF; 325C Quiz VI M; 410C  
 Lab. VII-VIII M; VII-IX WF; 290C

14f,su-15w—General Inorganic Chemistry. (Engrs. and miners without high school chem.) General laws of chemistry; the nonmetals, the metals, and their compounds. 4 cred. per qtr.; no prereq. Mr. Maynard.

- Lect. IV TS, III Th; 225C  
 Quiz III T; 100C  
 Lab. 14f VI-VII T, VI-VIII Th; 110C  
 15w VII-IX T, VI-VII Th; 110C

16s—Semimicro Qualitative Analysis. (Engrs. and miners.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, and other subjects pertinent to qualitative analysis. 5 cred.; prereq., 5 or 15. Messrs. Heisig and Maynard.

- (Engrs. and miners who entered with high school chem.)  
 Lect. IV TS, VI Th; 100C  
 Lab. (1) I-III T, VII-IX Th; 110C (3) III-IV M, I-IV F; 110C  
 (2) II-IV W, I-III S; 110C (4) VI-VIII W, VII-IX Th; 110C  
 (Engrs. and miners who entered without high school chem.)  
 Lect. IV TS, VI Th; 225C  
 Lab. (5) VII-IX T, VI-VIII W; 110C

96f-97w-98s†—Senior Thesis. 5 cred. per qtr.; sr.

101s—History of Chemistry. Historical development of the theories of chemistry from the period of the ancients to the present time is covered by this course. particular emphasis being given to modern theories and laws. 2 cred.; prereq.,

† In place of 16s, Course 11f,su or 12f,su may be taken by students registered in the College of Engineering and Architecture and the School of Mines and Metallurgy.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- Org. Chem. 52 or permission of instructor; IV T, 115C; V Th ar., C. Miss Cohen.
- 102s‡—Semimicro Qualitative Analysis. A course designed to acquaint the student with the universally applicable method and underlying principles in the identification of the more common cations by use of drop reactions on spot plate and filter paper, and separation by use of the centrifuge. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Barber.
- 103f-104w-105s—Advanced Inorganic Chemistry. A discussion of selected topics in theoretical inorganic chemistry. Fall—The Chemistry of the Solid State. Winter—Atomic Structure and the Chemical Bond. Spring—Co-ordination Compounds. 3 cred. per qtr.; prereq., Anal. Chem. 1, 2, Org. Chem. 52; Messrs. Klug, Maynard, and Taylor.  
103f III TThS; 215C  
104w-105s II TThS; 115C
- 109w-110s‡—Synthetic Inorganic Chemistry. Methods of preparation and purification of inorganic compounds of special interest. Current literature. 3 to 5 cred. per qtr.; prereq. Org. Chem. 51; 2 lect., with lab.; ar. Mr. Heisig.
- 115su‡—Commercial Products and Their Analysis. Study of current commercial products, their composition and methods of analysis. 5 cred.; prereq., Anal. Chem. 1 and 2; lect. and lab. Mr. Barber.
- 117s‡—Glassblowing. Exercises in the more important operations in building chemical apparatus. 1 cred.; jr., sr., grad.; no prereq.; ar. Mr. Taylor.
- 120f—Crystal Analysis. Discussion of the theory and methods of crystal analysis. Crystal geometry; nature and production of X rays; interaction of X rays and crystals; methods of crystal analysis. 3 cred.; prereq., Phys. Chem. 103; III MWF; 215C. Mr. Klug.
- 121w-122s—Crystal Chemistry. Discussion of the relation between crystal structure and the chemical and physical properties of solids. The elements; alloys, solid solutions, intermetallic compounds; inorganic compounds, hydrates, ammoniates, silicates, glasses; ionic and atomic radii; the chemical bond in crystals; lattice energies; molecular rotation in crystals; fiber structure; applications to qualitative and quantitative analysis and to colloidal phenomena. 3 cred. per qtr.; prereq., 120; III MWF; 115C(w), 215C(s). Mr. Klug.
- 134f-135w-136s—Seminar: Modern Problems in Inorganic Chemistry. 1 cred.; prereq., Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Sneed.
- 301f,su-302w-303s—Research in Inorganic Chemistry. Cred. ar. Messrs. Sneed, Reyerson, Miss Cohen, and Messrs. Heisig, Barber, Klug, Maynard, and Taylor.

## ANALYTICAL CHEMISTRY

Credits obtained in courses 144f, Applied Spectroscopy in Biology and 145w, Advanced Spectroscopy in Biology offered in the Department of Botany, are accepted for a major and a minor in analytical chemistry.

(A fee of \$2 per quarter is charged for Courses 1 to 9, inclusive.‡‡)

1w,su-2s—Quantitative Analysis. Introductory courses covering the general principles and methods of quantitative analysis. Typical problems are assigned and attention given to proper laboratory practice. Course 1, Gravimetric

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

‡‡ The \$2 fee is taken from the \$5 deposit blue card at the beginning of the quarter. This card is purchased from the bursar, first floor, Administration Building. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

Analysis. Course 2, Volumetric Analysis. 5 cred. per qtr.; prereq., Inorg. Chem. 13. Mr. Geiger.

Lect. VI M; 325C

Quiz VI F; 410C

Rec. (1) VI W; 115C, 215C

(2) VII W; 215C

Lab. (1, 2) any 9 hrs. on MWF afternoons

(3)<sub>w</sub> I-IV T, I-III Th, I-II S; 310C

(3)<sub>s</sub> I-IV T, VII-IX T, I-II S; 310C

7<sub>f,s</sub>,su—Quantitative Analysis. (Premed.) Introductory courses covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention is given to proper laboratory practice. 4 cred.; prereq., Inorg. Chem. 11, 12, or 16. Messrs. Geiger and Meehan.

7<sub>f</sub> Lect. (1, 2) VI F; 325C

(3) VI T; 325C

Quiz (1, 2) VI M; 410C

Rec. (1) VI W; 111C (Limit 35)

(3) VI Th; 325C

(2) VII W; 111C (Limit 35)

Lab. (1, 2) any (other) 8 hrs. on MWF afternoons; 310C

(3) VII-IX TTh, I-III or II-IV S; 310C

7<sub>s</sub> Lect. VI T; 325C

Rec. VI Th; 325C

Lab. VII-IX TTh, I-III or II-IV S; 310C

9<sub>w</sub>—Quantitative Analysis. (Dentists, engineers, miners.) Short introductory course covering general principles of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. 3 cred.; prereq., Inorg. Chem. 11, 12, or 16. Mr. Meehan,

Lect. VI Th; 325C

Rec. VI T; 325C

Lab. VII-IX TTh; 310C

9<sub>6f,su</sub>-97<sub>w</sub>-98<sub>s</sub>†—Senior Thesis. 5 cred. per qtr.; sr. Messrs. Kolthoff, Geiger, Sandell, and Meehan.

101<sub>w</sub>-102<sub>s</sub>†—Quantitative Analysis. General principles, methods, and procedure of quantitative analysis, both gravimetric and volumetric. Typical problems assigned and attention given to proper laboratory practice. 5 cred. per qtr.; prereq., Inorg. Chem. 13; VI-IX MWF; 325, 310C. Mr. Geiger.

103<sub>f</sub>†—Quantitative Inorganic Microanalysis. Representative methods of micro- and semi-microgravimetric, volumetric, and colorimetric analysis. 3 cred.; prereq., 1, 2; 1 lect., 6 hrs. of lab. ar. Class limited to 16 students. Mr. Sandell.

104<sub>s</sub>†—Qualitative Microchemistry. Use of microscope. Technique of handling small amounts of materials, inorganic qualitative analysis by means of crystal reactions and modern spot reactions. 3 cred.; prereq., 1, 2; 1 lect., 6 hrs. of lab.; ar. Mr. Sandell.

105<sub>w</sub>†—Polarizing Microscope. Its use and application to chemistry. Identification of substances. 3 cred.; prereq., Phys. Chem. 101. Mr. Sandell.

Lect. VI F; 215C

Lab. ar.

106<sub>f</sub>-107<sub>w</sub>-108<sub>s</sub>†—General Technical Analysis. Analysis of commercially important materials such as iron, steel, paper, and glass, also analysis of food materials. Use of microscope in technical problems. Quantitative analysis of heterogeneous mixtures, particle size determinations. 2 or 3 cred.; prereq., 1, 2; 1 lect. and 1 lab. hr. ar. Mr. Sandell.

† This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- 109f,w,s,†§—Rock Analysis. Laboratory course covering the technique of rock analysis. 3 cred.; prereq., 1, 2; 8 lab. hrs. per week ar.; 214P. Mr. Ellestad.
- 122f†—Advanced Analytical Chemistry Condensed review of modern fundamentals of gravimetric and volumetric analysis. 1 to 2 cred.; 1 lect. ar.; 1 rec. ar.; 3 to 6 hrs. lab. ar. Mr. Geiger.
- 123f,su†—Advanced Analytical Chemistry. Analysis of complex materials by modern methods. 3 cred.; prereq. 1, 2, or by permission; 1 lect. ar.; 6 hrs. of lab. ar. Mr. Meehan.
- 127s†—Optical Methods in Analytical Chemistry. 2 to 3 cred.; prereq., Phys. Chem. 103; 2 lect. and lab. hrs. ar. Mr. Meehan.
- 131f†—Applications of Indicators in Neutralization Reactions and  $pH$  Determinations. 3 cred.; prereq., 1, 2, and Phys. Chem. 103; VI MW; 315C; lab. hrs. ar. Mr. Kolthoff.
- 132w\*†—Electrometric Measurements and Titrations. Application of potentiometric and conductometric methods in analytical work. 3 cred.; prereq., 1, 2, and Phys. Chem. 103. Mr. Kolthoff.  
Lect. VI MW; 315C  
Lab. ar.
- 133s†—Voltammetry and Amperometric Titrations. A discussion of the use of the dropping mercury electrode (polarograph) and the platinum microelectrode in pure and applied chemistry. 2 to 4 cred.; prereq., Phys. Chem. 103; 2 lect. and lab. hrs. ar. Mr. Kolthoff.
- 134f-135w-136s—Seminar: Modern Problems in Analytical Chemistry. 1 cred. per qtr.; prereq. 1, 2, and Phys. Chem. 103; III T; 315C. Mr. Kolthoff.
- 137s†—Advanced Volumetric Analysis. 3 cred.; prereq. 131; 2 lect. and lab. hrs. ar. Mr. Kolthoff.
- 140w†—Water Analysis. Analysis of potable water with interpretation of results. 2 cred.; prereq., 1, 2. Mr. Sandell.
- 201f-202w-203s—Selected Topics in Analytical Chemistry. 3 cred. per qtr.; prereq., 1, 2, and 123. Mr. Kolthoff.
- 301f,su-302w-303s—Research in Quantitative Analysis. Cred. ar. Messrs. Kolthoff, Geiger, Sandell, and Meehan.

## ORGANIC CHEMISTRY

- 1f,w,su-2w,s,su††—Elementary Organic Chemistry. (Premed., predent., pharm.) Discussion of important classes of organic compounds, both aliphatic and aromatic. Laboratory work includes the preparation of typical substances. 4 cred. per qtr.; prereq., Inorg. Chem. 11. Messrs. Koelsch and Arnold.

1f-2w	Lect. I MWF; 100C Lab. conference II T; 325C Quiz I T; ar. Lab. (1) VI-IX T; 390C (2) VI-IX W; 390C	(3) I-IV S; 390C
1w-2s	Lect. IV MWF; 100C Lab. conference V T; 100C, 325C, 410C Quiz IV T; 410C, 111C, 315C, 325C, 410BC Lab. (1) VI-IX W; 390C (2) VI-IX Th; 390C	(3) I-IV S; 390C

\* For permissible substitute, see page 87.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

§ Registration limited. Permission of instructor must be obtained.



51f\*-52w\*†-153s‡—Elementary Organic Chemistry. (All except premed., predent., pharm.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Laboratory work includes the preparation of typical substances. Course 153 is a prereq. to all other advanced courses in organic chemistry. 5 cred. per qtr.; prereq., 15 cred. in chem. Messrs. Smith, Lauer, and Arnold.

Lect. III MWF; 100C

Lab. conference III S; 325C

Quiz III Th; 115C, 315C, 325C, 410C

Lab. (1) II-IV, VI-VIII T; 390C

(3) VII-IX WF; 390C

(2) VI-VIII TTh; 390C

54f-55w†-156s—Elementary Organic Chemistry (without laboratory). (All except premed., predent., pharm., and chem. majors.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. General discussion of organic laboratory practice. 3 cred. per qtr.; prereq., 15 cred. chem.; III MWThF; 100C. Messrs. Smith and Lauer.

96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; sr. May be taken with any member of the Organic Chemistry Division staff.

105f-106w-107s—Advanced Organic Chemistry. Advanced descriptive course covering the field of organic chemistry, together with an introduction to the literature of organic chemistry. Lectures and outside reading. Ability to read German is assumed. 3 cred. per qtr.; prereq., 153 or equiv.; I MWF; 325C. Mr. Smith.

110f‡‡—Organic Qualitative Analysis. Reactions of typical functional groups, identification of pure organic compounds, separation and identification of constituents of mixtures. 5 cred.; prereq., 153 or equiv.; lect. IV T and 1 hr. ar.; 315C; 9 hrs. of lab. work ar. Mr. Koelsch.

130s‡—Organic Quantitative Analysis. Methods of proximate and ultimate analysis of organic compounds, with special attention to semimicro methods. 2 or 3 cred.; prereq., 153 and Anal. Chem. 1 and 2; ar. One lecture and 3 or 6 hrs. lab. work per week. Mr. Lauer.

139f,w,s‡—Advanced Organic Chemistry Laboratory Work. Selected laboratory problems of an advanced nature, including some original work. Ability to read German is assumed. Students are advised to take this course during the winter quarter. Permission of instructor is required to take it at any other time. 2 to 5 cred.; prereq., 153. Mr. Arnold.

140f—Aromatic Compounds. Discussion of the chemistry of typical aromatic compounds, including derivatives of benzene, naphthalene, anthracene, phenanthrene, and other polynuclear hydrocarbons, together with a consideration of certain heterocyclic compounds which show aromatic character. The properties of these compounds will be illustrated by example chosen from the sterols and the alkaloids. 3 cred.; prereq., 153; IV MWF; 315C. Mr. Koelsch.

\* Students registering in Mil.Sci. 151f-152w will take their laboratory on VI-VIII Th, VII-IX F. This laboratory section is not open to any other students.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he present his blue chemistry deposit card.

‡‡ A charge of \$10 is made to cover special chemicals in this course.

- 141f—Reagents in Organic Chemistry. Discussion of typical reagents used in organic reactions; their limits of applicability, methods of use, and types of substances with which they react. 3 cred.; prereq., 153; IV MWF; 315C. Mr. Koelsch. (Not offered in 1941-42.)
- 142w-143s—The Chemistry of Natural Products. Discussion of the organic chemistry of important classes of natural products. 3 cred. per qtr.; prereq., 153; 142w I MWF; 315C; 143s, I MWF; 215C. Messrs. Lauer and Arnold.
- 153s—See 51f-52w-153s.
- 156s—See 54f-55w-156s.
- 201f-202w-203s—Organic Chemistry Seminar. 1 hr. per week. 1 cred. per qtr. Required of all graduate students taking major work in organic chemistry. Messrs. Smith, Koelsch, Lauer, and Arnold.
- 205f-206w—Theoretical Organic Chemistry. Structure, reaction mechanisms, relation of physical properties to constitution, and other topics of a theoretical nature. 3 cred. per qtr.; prereq., 107. (Not offered in 1941-42.)
- 212s—Physico-Organic Chemistry. Contributions made to organic chemistry by kinetic and equilibrium studies of organic reactions, including mechanisms of catalytic and ionotropic reactions; and an introduction to the current electronic formulations of organic reactions. Lectures, outside reading, and a term paper are required. 4 cred.; prereq., 107, Phys. Chem. 103, and calculus, or permission of instructor. (Not offered in 1941-42.)
- 301f-302w-303s—Research in Organic Chemistry. Cred. ar.; prereq., 110. Messrs. Smith, Lauer, Koelsch, and Arnold.

## PHYSICAL CHEMISTRY

- 96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; ar.
- 101f-102w-103s\*—Physical Chemistry. General survey of the subject. 3 cred. per qtr.; prereq., two years of college chem., one year of college phys., differential and integral calculus. Messrs. MacDougall, Livingston, and Hull.
- Lect. IV MWF; 325C  
Rec. (1-4) IV S; 325C, 410C, 166Ph, 315M(f)
- 104f-105w-106s\*‡—Physical Chemistry Laboratory. 1 or 2 cred. per qtr. To accompany or follow 101-102-103. Messrs. Livingston and Hull.
- Lab. conf. (for students registered for 2 cred.)  
(1) VI W; 410C  
(2) VI T; 410C
- Lab. (1) VI-VIII M, VII-VIII W; 190C (3) VI-VIII F; 190C  
(2) VII-VIII T, VI-VIII Th; 190C
- 107f,su-108w,su\*‡—Elementary Physical Chemistry. (Premed.) 4 cred. per qtr.; prereq., two years of college chem., one year of college phys. Messrs. Crawford and Hull.
- Lect. III MWF; 225C  
Rec. VIII T; ar.  
Lab. (1) I-III T; 190C  
(2) I-III Th; 190C
- 113f—Fundamentals of Reaction Kinetics. Order of reaction, collision theory, activation, chain reactions especially in gaseous systems. 3 cred.; prereq., 103. Mr. Livingston.

\* Physical Chemistry 101-102-103, 104-105-106, 107-108, 141-142 will be acceptable in partial or complete fulfillment of the course requirements for a minor in physical chemistry, for students who are not majoring in chemistry.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- 114w—Kinetics of Reactions in Liquid Solutions and in Heterogeneous Systems. Effect of solvents and electrolytes on reaction velocity. Homogeneous and heterogeneous catalysis. 3 cred.; prereq., 113. Mr. Livingston.
- 116f—Advanced Physical Chemistry. Thermodynamics. Designed to cover the fundamentals and the applications to chemical problems. 3 cred.; prereq., 103 and calculus; II TThS; 215C. Mr. Crawford.
- 117w—Advanced Physical Chemistry. Quantum theory and statistical mechanics, with emphasis on the applications to thermodynamic calculations and to reaction rates. 3 cred.; prereq., 103 and calculus; II TThS; 215C. Mr. Crawford.
- 118s—Advanced Physical Chemistry. Molecular structure and the nature of the chemical bond. 3 cred.; prereq., 117 or equivalent; II TThS; 215C. Mr. Crawford.
- 128f-129w-130s—Colloid Chemistry. General survey of surface chemistry, adsorption, catalysis, electrokinetic phenomena, lyophilic and lyophobic colloids. 2 cred. per qtr. (Not offered in 1941-42.)
- 131f-132w-133s‡—Colloid Chemistry Laboratory. Cred. and hrs. ar. Must be preceded or accompanied by 128, 129, or 130. (Not offered in 1941-42.)
- 141su-142su\*—Special Topics in Physical Chemistry. 2 cred., acceptable towards minor for students not majoring in chemistry; prereq., two years of college chem., one year of college phys.; lect. ar. Messrs. Livingston and Crawford.
- 161f-162w—Nuclear Chemistry and Radioactivity. The properties of atomic nuclei; radioactive disintegration; properties of radioactive elements and of their radiations; transmutation and artificial radioactivity; modern theories of nuclear structure. 3 cred. per qtr; prereq., 103; IV MWF; 215C. Mr. Hull.
- 175s—Photochemistry. General survey, including a discussion of spectroscopy, with particular reference to the visible and ultraviolet absorption spectra of molecular gases. 3 cred.; prereq., 103 and Phys. 9. Mr. Livingston.
- 201f-202w-203s—Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. 4 cred. per qtr.; prereq., 103 and calculus. II MWF; 215C. Mr. MacDougall.
- 204f-205w-206s—Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure of atom, quantum theory. 4 cred. per qtr; prereq., 103 and calculus. (Not offered in 1941-42.)
- 207s—Modern Theories of Acidity and Basicity. 2 cred.; prereq., 103; ar. Mr. Kolthoff.
- 211f-212w-213s—Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Cred. ar.; prereq., 103. Mr. MacDougall and staff.
- 221f-222w-223s—Colloid Seminar. 1 cred. per qtr. Mr. Reyerson.
- 251f-252w-253s—Physical Chemistry Seminar. For students taking advanced courses in physical chemistry. 1 cred. per qtr.; IV T; 215C. Mr. MacDougall and staff.

\* Physical Chemistry 101-102-103, 104-105-106, 107-108, 141-142 will be acceptable in partial or complete fulfillment of the course requirements for a minor in physical chemistry, for students who are not majoring in chemistry.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- 264f,w,s—Radioactivity Laboratory. Use and standardization of electroscopes, radioactive measurements, and quantitative determination of radium in ores, minerals, waters, and plant products. 1 or 2 cred. Must be preceded or accompanied by 161. Mr. Hull.
- 301f,su-302w-303s—Research in Physical Chemistry, including work in electrochemistry, photo- and radio-chemistry, colloids, and crystal structure. Cred. ar. Messrs. MacDougall, Kolthoff, Lind, Reyerson, Livingston, Crawford, Klug, and Hull.

## CHEMICAL ENGINEERING

- 31s—Chemistry of Engineering Materials. Application of general chemistry in engineering practice. Technology and properties of wood, alloys, fuels, water, lubricants, cements, coating materials, plastics, etc. 3 cred.; prereq., Inorg. Chem. 16; IV MWF; 215C. (Not open to chem. engrs.) Mr. Montonna.
- 76f-77w‡—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Engineers with one year of chem. and one year of phys. 3 cred. per qtr. Messrs. Montillon and Grove.

Lect. III TTh; 111C  
Lab. VI-IX W

- 80s—Chemical Engineering Materials. The technology, physical and chemical properties, and economic considerations of materials used in the construction of chemical engineering equipment and plants. Ferrous and nonferrous metals and alloys; woods, cements, ceramic, and plastic materials; textiles; rubber; protective materials, etc. 1 cred.; prereq., Inorg. Chem. 13; II TS; 325C. Mr. Piret.

96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; ar.

- 101f—Unit Operations. Unit operations, and materials of construction, performance, and uses of equipment. Crushing, grinding, size separation, fluid flow, and problems in chemical stoichiometry. Lectures and recitations. 3 cred.; prereq., 80, Anal. Chem. 1, 2. Messrs. Mann, Stoppel, Grove, Pike, and Piret.

Lect. I TS; 225C  
Rec. (1) I MTh; 115C (3) II WS; 315C  
(2) I MTh; 111C (4) II WS; 111C

- 102w‡—Unit Operation. Continuation of 101 with discussions on filtration, heat transfer, evaporation, humidification, and air conditioning and drying. Their applications including economic balance and the solution of problems. Lectures, recitations, and laboratory. 6 cred.; prereq., 101. Messrs. Mann, Stoppel, Grove, Pike, and Piret.

Lect. I TS; 225C  
Rec. (1) I MWThF; 111C (3) I MWF, 215C; Th, 315C  
(2) I MWThF; 115C (4) I MWF, 410C; I Th, 410bC  
Lab. (1) VI-IX M; 90C (4) VI-IX Th; 90C  
(2) VI-IX T; 90C (5) VI-IX F; 90C  
(3) VI-IX W; 90C

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

103s‡—Unit Operations. Continuation of 101 and 102. Discussions and problems on distillation, absorption, extraction, and crystallization. Lectures, recitations, and laboratory. 6 cred.; prereq., 102. Messrs. Mann, Stoppel, Grove, Pike, and Piret.

Lect. I ThS; 325C

Rec. (1) I MTWF; 115C  
(2) I MTWF; 315C

(3) I MTWF; 410C  
(4) I MTWF; 111C

Lab. (1) VI-IX M; 90C  
(2) VI-IX T; 90C  
(3) VI-IX W; 90C

(4) VI-IX Th; 90C  
(5) VI-IX F; 90C

105f\*‡—Fuels and Combustion. The technology of solid liquid and gaseous fuels, analysis, combustion characteristics, specific uses, and furnaces. Calculation of heat and material balance. Lectures, recitations, laboratory. 4 cred.; prereq., Anal. Chem. 1, 2. Messrs, Stoppel, Grove, Pike, and Piret.

Lect. I WF; 410C

Rec. (1) II W, 115C; II S, 325C  
(2) II W, 410bC; II S, 225C

(3) I M, 410C; I Th, 315C  
(4) I MTh; 410bC

Lab. (1) VI-IX M; 10, 90C  
(2) VI-IX T; 10, 90C  
(3) VI-IX W; 10, 90C

(4) VI-IX Th; 10, 90C  
(5) VI-IX F; 10, 90C

106w‡—Petroleum and Petroleum Products. Technology and testing of petroleum products, principally gasoline, lubricating oils, and fuel oils. Lectures and laboratory. 3 cred.; prereq., Org. Chem. 51, or by permission. Mr. Stoppel.

Lect. III MWF; 325C

Lab. VI-IX F; 10C

107s—Petroleum Refinery Engineering. Unit operations and chemical engineering design principles and calculations involved in the manufacture of the principal petroleum products. Lectures and recitations. 3 cred.; prereq., 103 or permission of instructor; III MWF; 215C. Mr. Piret.

117w-118s—Chemical Engineering Equipment Design. Fundamental principles in the design of simple chemical engineering equipment. Recitation and drawing room. 3 cred.; prereq., 103. Messrs. Montonna and Grove.

Rec. II MWF, 325(w); II MWTh, 410C(s)

Lab. (1) VI-IX T; 410bC

(2) VI-IX Th; 443C

120f—Chemical Engineering Thermodynamics. A study of the principles of the three fundamental laws of energy as applied to chemical engineering problems. Lectures and recitations. 3 cred.; prereq., 103; IV MWF; 410C. Mr. Grove.

121f—Chemical Engineering Economics. The economic and business considerations controlling chemical engineering industries and their statistical analysis. Economic factors offering plant location, layout, and design. Unit operation costs. Principles of management operation, and control. Lectures. 3 cred.; prereq., 131; II MWF; 225C. Mr. Montonna.

131s—Industrial Inorganic Chemistry. Applications of unit operations common to chemical industries, chemistry involved, equipment used, marketing of products, utilization of by-products, use of trade journals. Topics: industrial water, acids and alkalis, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. 4 cred.; prereq., (for chem. engrs.) 102; (for chem.) Anal. Chem. 1, 2; II MTWFS; 225C. Mr. Mann.

\* Each laboratory section is limited to 16 students.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- 132f—Industrial Organic Chemistry. Similar to 131 but covering organic field. Destructive distillation of coal and wood, petroleum oils, paper, organic processes, synthetic products, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. 3 cred.; prereq., (for chem. engrs.) 103 and 131; (for chem.) Org. Chem. 52; I MWThF, II T; 225C. Mr. Mann.
- 133f—Chemistry of Explosives. History and technology of modern explosives, their manufacture and uses, war gases. Lectures, required reading, and reports. 3 cred.; prereq., Org. Chem. 153. I MWF; 215C. Mr. Montonna.
- 134f—Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. 3 cred.; prereq., Org. Chem. 153. (May be accompanied by laboratory work in 160.) (Not offered in 1941-42.)
- 136w—Chemistry and Technology of Cellulose. Processes and industries based on the use of cellulosic materials including the chemical and technological considerations. Pulp and paper, plastics, esters, rayon, etc. 3 cred.; prereq., Org. Chem. 153; I MWF; 225C. Mr. Montonna.
- 140s—Sanitary Chemistry. Discussion of the chemistry of sewage and potable waters. Purification of water supplies, and the treatment of municipal and industrial wastes. Lectures and recitations. 3 cred.; ar.; prereq., jr., sr. Mr. Stoppel.
- 141s—Gas Manufacture and Distribution. Fundamental principles of manufacture, purification, and distribution of coal gas, carbureted water gas, and other industrial fuel gases, and the equipment for manufacture. Problems and reports on recent developments. 3 cred. Open to junior and senior chemists and chemical engineers; others by permission. Mr. Montillon.
- 151f,su\*‡—Chemical Manufacture (Inorganic). Manufacture of technical products on a scale large enough to afford data for the determination of operating conditions and costs of manufacture. Use of semi-plant scale equipment. Technical trade journals used. Laboratory. 3 or more cred.; prereq., 103, 131. Messrs. Montonna and Grove.
- 152w,su\*‡—Chemical Manufacture (Organic). Similar to 151 but covering the unit organic processes. Laboratory. 3 or more cred.; prereq., 103, 131. Messrs. Montonna and Grove.
- 153f-154w-155s-156su‡—Special Problems. Investigations in chemical engineering. Library or laboratory research. 3 or more cred. per qtr.; 1 conference hr. and 2 lab. hrs. ar. Chemical Engineering staff.
- 160f‡—Intermediates and Dyestuffs Laboratory. Manufacture of intermediates and dyestuffs using semi-works equipment. Operations on sulphonation, hydroxylation, nitration, reduction, alkylation, diazotization, coupling, etc. Laboratory. 3 or more cred.; prereq., 131, 152, and preceded or accompanied by 134. Mr. Montonna.
- 176f-177w‡—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. 4 cred. per qtr.; prereq., Phys. Chem. 103, or by permission. Messrs. Montillon and Grove.

Lect. III MWF; 111C

Lab. VI-IX Th or F; 25C

\* Required for chemical engineers during Summer Session.

‡ This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

- 179s†—Applied Electro-Organic Chemistry. Theory and practice of the electro-chemistry of organic compounds. Lect. and rec., 3 cred.; lab. 1 or 2 cred. optional; prereq., 176-177 or by permission; III MWF; 115C. Mr. Mann.
- 187s—Chemical Engineering Trip. Various industrial plants in the Middle West are visited by the class on a trip which lasts about ten days, during the spring vacation period. Written reports covering the plants must be submitted. Required of seniors in chemical engineering. 2 cred.; prereq., 131, 132. Mr. Mann.
- 201f-202w-203s—Seminar. Presentation and discussion of papers concerning the newer developments in chemical engineering. 1 cred. per qtr.; IV W; 111C. Mr. Mann.
- 205f-206w-207s—Advanced Problems in Unit Operations. A study of new developments in the unit operations. Theory and practical applications to equipment and plant process design including economic balance problems. 2 cred. per qtr.; prereq., 103. Open to graduate students only. (Not offered in 1941-42.)
- 208f-209w-210s—Advanced Chemical Engineering. An extended study of the principles of chemical engineering and their applications to industrial problems, together with surveys of the literature. 2 cred. per qtr.; prereq., 104. Open to graduate students only. I TTh; 215C. Mr. Montillon.
- 211f-212w-213s—Chemical Engineering Plant Design. Planning of plants and design of equipment based on collected data for the same. Classroom and drawing room work. 2 cred. per qtr.; prereq., 103; VI-IX T and 2 hrs. ar. Messrs. Montillon and Piret.
- 301f,su-302w-303s—Research in Chemical Engineering. Unit operations, applied electrochemistry and electric furnace work, and chemical manufacture. Cred. ar. Messrs. Mann, Montillon, Montonna, and Stoppel.

## CIVIL ENGINEERING

## SURVEYING

- 11f—Surveying. Lectures and field problems; use of steel tape and transit. Computation and platting of field notes, determination of areas. 3 cred.; prereq., M.&M. 12, Dr. 2. Mr. Boon.
- |                                  |                        |
|----------------------------------|------------------------|
| Lect. (1) III Th; 21E            | (2) I Th; 21E          |
| Lab. (1) VI-IX M, VI-VIII Th; 1E | (3) I-III, VI-IX T; 1E |
| (2) VI-IX F, I-III S; 1E         |                        |
- 12w—Surveying. Lectures and drafting room. Platting of profiles and mass diagrams, computation of earthwork volume and overhaul. Public land survey. Mapping and conventional signs. 3 cred.; prereq., 11. Messrs. Cutler, Zelnor, and Boon.
- |                                    |                          |
|------------------------------------|--------------------------|
| Lect. (1) III Th; 21E              | (2) I Th; 21E            |
| Lab. (1) VI-IX M, VI-VIII Th; 217E | (3) I-III, VI-IX T; 217E |
| (2) VI-IX F, I-III S; 217E         |                          |
- 13s—Surveying. Lectures and field problems; differential and profile leveling; cross sections, circular curves, and adjustment of instruments. 3 cred.; prereq., 12. Messrs. Cutler and Boon.
- |                                   |                          |
|-----------------------------------|--------------------------|
| Lect. (1) I Th; 21E               | (2) III Th; 21E          |
| Lab. (1) I-IV T, 21E; I-III S; 7E | (3) II-IV T, I-IV S; 21E |
| (2) VII-IX M, VI-IX W; 21E        |                          |

† This course carries a laboratory fee of \$2 per quarter for undergraduate students. No student can be assigned a desk in the laboratory until he presents his blue chemistry deposit card.

14f—Surveying. Complete topographical survey, stadia method, is made and platted. 3 cred.; prereq., 13. Mr. Zelner.

- (1) VI-IX WTh; 21, 217E (3) VI-IX TF; 21, 217E  
 (2) VI-IX M, I-IV S; 21, 217E

15w—Surveying. Purpose and theory of triangulation, meridian determination, base line measurements, computations. Theory and use of the sextant. Hydrographic surveying. Aerial mapping. Applied problems. 2 cred.; prereq., 14. Mr. Zelner.

- (1) II-III T, I W, III F; 21E (2) II MWThF; 21E

16s—Surveying. Classroom and field. Field problems with the sextant. Triangulation reading and computations. Plane table theory. Various field solutions of the "three point" problem. Plane table survey based on triangulation control. Topographic map. 2 cred.; prereq., 15. Mr. Zelner.

- (1) VI-IX M, II-III S; 21E (2) I-IV T, 5E; II-III F, 21E

17i,s—Surveying. Short course including problems in chaining, transit and tape surveys; differential, trigonometric and profile leveling, computations and platting of notes, etc. Open to students other than civil engineers. 3 cred.; prereq., M.&M. 12. Messrs. Cutler, Zelner, and Boon.

- 17f I-IV MW; 217E  
 17s (1) VI-IX ThF; 21E (3) VI-IX T, 21E; VI-IX W, 22E  
 (2) I-IV MW; 21E (4) I-IV M, 217E; I-IV F, 21E

23su—Summer Camp. Six weeks immediately preceding the beginning of the senior year. Extended railroad, topographic hydrographic, and triangulation surveys. 9 cred.; prereq., 16, 22. Fee, \$25 tuition, \$1 health fee, total \$26. Messrs. Cutler, Zelner, and Boon.

109w,s—Cadastral Surveying. Study of the newer methods of accurate surveys of property with geodetic control and with co-ordinates of property monuments. 2 cred.; prereq., 16. Mr. Boon.

- 109w I M, 106E; I F, 136E  
 109s V MF; 206E

110f,w—Errors in Surveying. Study of the sources, importance, and reduction of errors in surveying. 2 cred.; prereq., 23. Mr. Boon.

- 110f IV TS; 7E  
 110w IV MF; ar.

111w,s—Methods of Computation. Study of the methods used in various problems in precise and geodetic surveys and distribution of errors. 2 cred.; prereq., 110; ar. Mr. Boon.

#### RAILWAY ENGINEERING

21w—Railway Engineering. General survey of the problems of railway location, including grades, curvature, rise and fall, etc. 2 cred.; prereq., 13. Mr. Boon.

- Lect. III W; 227E  
 Lab. (1) I-IV S; 229E (3) VI-IX W; 229E  
 (2) I-IV T; 229E

22s—Railway Engineering. Study of the construction and maintenance of railway track and structures. Simple, compound, and spiral curves, and turnouts. 2 cred.; prereq., 21. Messrs. Cutler and Boon.

- Lect. II Th; 227E  
 Lab. (1) VII-IX F; 229E (2) VI-VIII Th; 229E



- 121f—Railway Engineering. Train resistance, ruling and momentum grades, curvature, distance, rise and fall as factors in location and operation of railroads. Train loading, acceleration, retardation; locomotives and equipment. Operating costs governing grade revision. 3 cred.; prereq., 22. Mr. Cutler.
- Lect. II F; 227E  
Lab. (1) VII-IX WTh; 229E (2) I-III TTh; 229E
- 122w—Railway Engineering. Lectures, office work, and field inspection. Design and operation of various types of yards and terminals, and terminal facilities, including the hump, engine house, coal and water station. Signaling and interlocking. 3 cred.; prereq., 22. Mr. Cutler.
- 123s—Railway Engineering. Design and construction of railroad buildings and structures; culverts, wooden trestles, switches, crossovers, crossing frogs, etc. Earthwork computation, estimates and reports. Distribution of material by mass diagram. 3 cred.; prereq., 22. Mr. Cutler.
- 124w—Transportation. Development of railway and inland waterway transport, railway regulation and control with special reference to the 1920 Railway Transportation Act, geographical, financial, and rate grouping of railways. Interstate Commerce Commission method of accounting, cost and value of service, present systems, and organization. 3 cred.; prereq., 22; II MWF; 227E. Mr. Cutler.
- 125s—Transportation. Specific illustrative problems: Twin City and Mississippi Valley traffic situation, Mississippi River experiment, New York Barge Canal, Great Lakes traffic, Panama Canal status. 3 cred.; prereq., 121. Mr. Cutler.
- 221f-222w-223s—Railway Administration. Analysis of railway organization and methods of management and operation. Special problems. 3 cred. per qtr.; prereq., 122. Mr. Cutler.
- 224f—Railway Terminals and Yards. Continuation of Course 123. 3 cred.; prereq., 122. Mr. Cutler.

## STRUCTURAL ENGINEERING

- 31f—Stresses in Structures. Algebraic and graphic analysis of various types of bridge trusses for fixed and moving loads. 2 cred.; prereq., M.&M. 26.
- Lect. I TTh; 107E  
Lab. (1) VIII-IX M; 229E (2) VI-VII F; 229E
- 32w—Stresses in Structures. Analysis of simple span bridge trusses. Standard engine loadings and equivalent uniform loads. 3 cred.; prereq., 31.
- Lect. III M, VI F; 227E  
Lab. (1) II-III Th; 229E (2) VI-VII T; 229E
- 33s—Elementary Structural Design. Designing principles and methods. Complete designs and detail drawings of typical simple structures. 4 cred.; prereq., 32, M.&M. 128, Dr. 23.
- Lect. II M, III Th; 227E  
Lab. (1) VI-VIII TW; 229E (2) VI-VIII M, II-IV S; 229E
- 37s—Structural Engineering. (Ag.E., M.E., E.E.) Elementary structural analysis and design in wood, steel, and reinforced concrete. 3 cred.; prereq., M.&M. 26 or 84.
- Lect. VI MT; 227E  
Lab. VI-IX Th; 217E

- 38f—Stresses in Structures (Arch.). Application of laws of equilibrium to simple structures. 3 cred.; prereq., M.&M. 92; I MWF; 210Ex.
- 39w—Structural Design (Arch.). General principles of structural design. Girders, columns, and roof trusses. 3 cred.; prereq., 38, M.&M. 93; I MWF; 320E.
- 41s—Reinforced Concrete (Arch.). Brief course in theory and design with special reference to buildings. 3 cred.; prereq., 39; I MWF; 320E.
- 130f—Statically Indeterminate Structures. Theory of deflections and statically indeterminate stresses and their application to redundant members and reactions, continuous beams, and frames. 3 cred.; prereq., 33, M.&M. 128.  
Lect. VI TF; 227E  
Lab. VIII-IX M; 225, 227E
- 131w—Analysis of Bridges and Buildings. Analysis of bridges and buildings, with special emphasis on continuity. 2 cred.; prereq., 130; VI Th, 227E; VII-IX Th, 225E.
- 132s—Design of Bridges and Buildings. 2 cred.; prereq., 131; II W, 227E; VII-IX Th; 225E.
- 135w—Advanced Structural Design (Arch.). Analysis of structures as rigid frames. Wind stress analysis. Effect of temperature, and settlement of foundations. Applications to steel and concrete frames. 3 cred.; prereq., 41.
- 137w,s—Structural Laboratory. Theoretical and experimental analysis of structural members and models. 2 cred.; prereq., 134, 141. (Limited to 16 students each section.)  
137w Lect. VI F; 201Ex  
Lab. (1) VII-IX W; Ex (2) VII-IX F; Ex  
137s Lect. II M; 215Ex  
Lab. (1) VII-IX M; Ex (2) I-III S; Ex
- 141f—Reinforced Concrete. Principles of reinforced concrete. Theory of beams, slabs, and columns, and the application to ordinary structures. 3 cred.; prereq., 33; VI MTh, 227E; I-II S, 225E.
- 142w—Reinforced Concrete Design. Continuation of 141 with special emphasis on the practical features of the design of buildings, bridges, retaining walls, footings, etc. 3 cred.; prereq., 141; VI M, III F, 227E; VI-VII T, 225, 227E.
- 143s—Reinforced Concrete Arches. Analysis and design of reinforced concrete arches and rigid frame bridges. 3 cred.; prereq., 134, 142. Mr. C. A. Hughes.
- 146f,w,s—Plain Concrete. Design and control of concrete mixtures. Practice in control tests of concrete and concrete materials. Lectures and laboratory work. 3 cred.; prereq., M.&M. 141. (Limited to 16 students per qtr.)  
146f Lect. IV MW; 215Ex Lab. VI-IX W; Ex  
146w Lect. II TTh; 201Ex Lab. VI-IX W; Ex  
146s Lect. I TTh; 227E Lab. VI-IX F; Ex
- 147w—Foundations. Design and construction of footings, cofferdams, and caissons for bridges and buildings. Piers and abutments. Underpinning of buildings. Exploration and testing of foundation sites. Excavation and removal of materials from foundation site. 2 cred.; prereq., 33, 141, M.&M. 128; III TS; 227E.
- 148f-149w-150s—Advanced Concrete. Short research problems in concrete. 2 cred. per qtr.; prereq., 146; ar.
- 180f-181w-182s—Advanced Structural Laboratory. Special problems. 3 to 5 cred. per qtr.; prereq., 137.

- 234f-235w—Advanced Theory of Structures. Application of the theory of indeterminate stresses to the more complex problems of structural analysis. Continuous and swing bridges, simple and multiple arch and suspension systems, wind stresses in tall building frames, secondary stresses. 3 to 5 cred. per qtr.; prereq., 132, 142.
- 236s—Advanced Structural Design. Effect of shrinkage and plastic flow. Eccentrically loaded concrete sections. Nonsymmetrical bending. Lateral earth pressure theories. Design of sheet piling, bearing piles, and cofferdams. 3 to 5 cred.; prereq., 134, 147.
- 245f-246w-247s—Seminar. Special topics in the theory of structures. 3 to 6 cred. per qtr.; prereq., 134, 142.

## HIGHWAY ENGINEERING

- 51f-52w—Highways and Pavements. Elementary course with field inspection, relating to the economics, location, construction, and maintenance of highways and pavements. 3 cred. per qtr.; prereq., 12. (Laboratory sections limited to 12 students.) Mr. Lang.
- |     |                              |                      |
|-----|------------------------------|----------------------|
| 51f | Lect. (1) VII M, VI F; 215Ex | (3) VI MTh; 215Ex    |
|     | (2) VI TW; 215Ex             |                      |
|     | Lab. (1) II-IV T; 210Ex      | (4) VII-IX W; 210Ex  |
|     | (2) VII-IX F; 210Ex          | (5) VII-IX Th; 210Ex |
|     | (3) VII-IX T; 210Ex          | (6) I-III S; 210Ex   |
| 52w | Lect. VII F; 110Ex           |                      |
|     | Rec. (1) II F; 215Ex         | (3) III F; 215Ex     |
|     | (2) III Th; 215Ex            |                      |
|     | Lab. (1) VI-IX T; 210Ex      | (4) I-IV S; 210Ex    |
|     | (2) VI-IX Th; 210Ex          | (5) VI-IX M; 210Ex   |
|     | (3) VI-IX W; 210Ex           | (6) I-IV T; 210Ex    |
- 151f,s—Highway Laboratory. Investigation in co-operation with State Highway Department. 3 to 5 cred.; prereq., 52. Mr. Lang.
- 152s—Highway Design. Preparing of a plan and specifications for short sections of highways and city streets, also making estimates of materials and cost. 3 to 5 cred.; prereq., 52. Mr. Lang.
- 153w,s—Engineering Properties of Soils. Origin and composition, characteristics, structural properties, and practical design and construction. 3 cred.; prereq., jr. or sr. Mr. Lang.
- 154w,s—Soils Laboratory. Laboratory study of properties of soils which pertain to their stability. 1 cred.; prereq., jr. or sr.; ar. Mr. Lang.
- 155s—Field Soil Studies. Soil classification and mapping, analysis of soil conditions where road failures have occurred. 2 cred.; prereq., 52. Mr. Kersten.
- 156w—Highway Transport. Development, economic field, relation to other forms of transportation. Highway transport surveys, economics of location, economics of selection of type of surface, effect of vehicle on road and road on vehicle. 3 cred.; prereq., 51; I MWF; 215Ex. Mr. Lang.

## HYDRAULIC ENGINEERING

- 161f—Power. Elementary hydrology; precipitation, evaporation, transportation, run-off, storage and lake levels, types of water power development; dams, waterways, penstock, turbines, and accessory equipment. 4 cred.; prereq., M.&M. 129. Mr. Bass.
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|--------------------------|----------------------|
| Lect. II MW; 227E        |                      |
| Lab. (1) I-III TTh; 225E | (2) VII-IX TTh; 229E |

- 164f—Water Conservation. Weather variations and cycles, variable stream flow and water levels with respect to control in problems of public water supply, sewage disposal, water power, navigation, floods, and low water. National and state water conservation policies with discussion of typical problems. 3 cred.; prereq., M.&M. 129. Mr. Bass.
- 263s—Hydraulic Engineering Problems. Special hydraulic problems in laboratory, drafting room, and field. 3 to 5 cred.; prereq., 164.

## MUNICIPAL AND SANITARY ENGINEERING

- 162w-163s—Water Supply and Sewerage. Sources of water supply; quality of water. Methods of testing, collection, distribution, and purification of water. Selection of pumping machinery and motive power. Sewer systems and sewage disposal works. 3 cred. per qtr.; prereq., 161, M.&M. 129. Mr. Bass.
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|------|------------------------|----------------------------------|
| 162w | Lect. IV TS; 136E      | Lab. VII-VIII M, VIII-IX T; 225E |
| 163s | Lect. II T, IV F; 227E | Lab. VI-VIII T, II-III Th; 225E  |
- 165s—Public Health Engineering. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems, with the treatment and disposal of sewage, excreta, and waste, and with the production, pasteurization, and distribution of milk. Public health engineering methods as applied to sanitary problems in urban and rural communities including schools, institutions, camps, bathing places, dwellings, etc. Lectures, field and laboratory demonstrations. 3 cred.; prereq., P.M.&P.H. 50. Messrs. Whittaker, Pierce, associates, and guest lecturers.
- 167—Industrial Hygiene Engineering. Field and laboratory methods used by the industrial hygiene engineer in the study and control of occupational health hazards. Lectures, field and laboratory demonstrations. 3 cred.; open to sr. Mr. Pierce.
- 171w—Building Sanitation. Location and orientation of buildings; lighting, ventilation, water supply, plumbing, sewerage, and refuse disposal. 2 cred.; prereq., sr. arch. only; II TTh; 227E. Messrs. Bass and .....
- 261f-262w—Water and Sewage Purification. Design of water purification and sewage disposal works. 3 to 5 cred. per qtr.; prereq., 163. Mr. Bass.

## GENERAL

- 53s—Civil Engineering Practice. Greater problems of engineering. Interrelations of various branches of engineering in practice. Legal, financial, and business functions of the engineer. Relations of the engineer to government and public affairs. 3 cred.; open to jr. and sr. Mr. Bass.
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|----------------------|----------------|
| Lect. III MW; 227E   |                |
| Rec. (1) III F; 227E | (2) VI F; 227E |
- 172s—City Planning. Physical elements of the city; topography, drainage, geology. Public works and structures. Internal and external transportation. Zoning. Subsurface structures. Esthetic features of the city. 3 to 5 cred.; prereq., 52; I MWF; 7E. Messrs. Bass and R. C. Jones.
- 280f-281w-282s—Civil Engineering Research. Original work in concrete, structural steel, hydraulics, municipal or transportation problems. Investigations, reports, tests, designs. 5 cred. per qtr.; by permission. Messrs. Bass, Cutler, Lang, and Wise.

## DAIRY HUSBANDRY

1s—Elements of Dairying. Lectures and demonstrations with opportunity for laboratory practice. The history and development of the dairy industry. The origin and classification of domesticated cattle. History and characteristics of the dairy breeds of cattle. Milk, its composition, food value, chemical and physical properties with relation to the handling of milk and the manufacture of milk products. Two trips to dairy plants are required. 3 cred.; prereq., entrance cred. in chem. or Chem. 1, 4, or 9; III MWF; 100HH(UF). Mr. Combs.

## DRAWING AND DESCRIPTIVE GEOMETRY

1f,w,s,su-2w,s,su—Engineering Drawing. Elements of drafting including an introductory course in methods of representation, and constructive geometry. Graphs and formulas. Sketching, lettering, working drawings, conventions, standards, tracing, and blueprinting. 3 cred. per qtr.; prereq., solid geometry. Messrs. Potter, Schuck, Cruzen, and Quaid.

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|----|--|----------------------------------|
| 1f | (1) VI-VII MWThF; 455C                 | (6) I-II MTWTh; 101E             |
|    | (2) VI-VII MWThF; 443C                 | (7) I-II MTWTh; 417C             |
|    | (3) VI-VII MWThF; 445C                 | (8) I-II MTWTh; 443C             |
|    | (4) VIII-IX MW, VI-VII T, I-II F; 201E | (9) III-IV MWF, I-II S; 443C     |
|    | (5) VIII-IX MW, VI-VII T, I-II F; 445C | (10) III-IV MWF, I-II S; 415C    |
| 1w | (1) VI-VII MTWF; 415C                  | (4) I-II MWThS; 455C             |
|    | (2) VI-VII MTWF; 417C                  | (5) III-IV MF, I-II TS; 417C     |
|    | (3) VIII-IX MWF, VI-VII Th; 1E         |                                  |
| 2w | (1) VI-VII MTWF; 1E                    | (6) VIII-IX MWF, VI-VII Th; 455C |
|    | (2) VI-VII MTWF; 445C                  | (7) I-II MWThS; 443C             |
|    | (3) VI-VII MTWF; 455C                  | (8) I-II MWThS; 101E             |
|    | (4) VIII-IX MWF, VI-VII Th; 417C       | (9) III-IV MF, I-II TS; 445C     |
|    | (5) VIII-IX MWF, VI-VII Th; 445C       | (10) III-IV MF, I-II TS; 1E      |
| 2s | (1) VI-VII MWF, VIII-IX Th; 455C       | (4) I-II MWThS; 445C             |
|    | (2) VI-VII MWF, VIII-IX Th; 417C       | (5) I-II MWThS; 417C             |
|    | (3) VI-VII MTWF; 415C                  |                                  |

3f,s,su—Descriptive Geometry. Elementary course in the methods of representation, correlated in part with analytical geometry. Graphical and algebraic solutions. Lectures, demonstrations, and drafting. 3 cred.; prereq., 2, M.&M. 11.

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| 3f | (1) VI-VII MTWTh; 101E           | (3) VIII-IX MWF, III-IV S; 101E |
|    | (2) VI-VII MTWTh; 415C           |                                 |
| 3s | (1) VI-VII MWF, VIII-IX Th; 1E   | (6) VIII-IX MTThF; 201E         |
|    | (2) VI-VII MWF, VIII-IX Th; 445C | (7) I-II MWThF; 1E              |
|    | (3) III-IV MWF, VI-VII T; 1E     | (8) I-II MWThF; 215C            |
|    | (4) III-IV MWF, VI-VII T; 455C   | (9) I-II MWThF; 443C            |
|    | (5) VIII-IX MTThF; 415C          | (10) I-II MWThF; 455C           |

7f,w,su-8w,s,su\*—Engineering Drawing and Descriptive Geometry. (Chem. and chem. engr.) 3 cred. per qtr.; prereq., solid geometry. Messrs. Myers, Schuck, and Cruzen.

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|----|----------------------------------|----------------------------------|
| 7f | (1) III-IV T, VIII-IX TThF; 445C | (3) III-IV T, VIII-IX TThF; 417C |
|    | (2) III-IV T, VIII-IX TThF; 455C |                                  |
| 7w | (1) III-IV MWF, VIII-IX Th; 201E | (3) III-IV TW, VIII-IX TTh; 417C |
|    | (2) III-IV MWF, VIII-IX Th; 455C | (4) III-IV TW, VIII-IX TTh; 415C |
| 8w | III-IV TW, VIII-IX TTh; 445C     |                                  |
| 8s | (1) III-IV MTWF; 417C            | (3) III-IV MWF, I-II S; 443C     |
|    | (2) III-IV MTWF; 445C            | (4) III-IV MWF, I-II S; 415C     |

\* For permissible substitute, see page 87.

9s,su—Topographic Drawing. (Mines.) Same as Drawing 13 with one additional credit in elementary drawing. Open to mining students who took solid geometry in the fall quarter. 3 cred.; prereq., 1 or 7, III-IV MWF, I-II S; 205M. Messrs. Levens and Potter.

10f,su—Solid Geometry. Lines and planes in space, dihedral and polyhedral angles, polyhedrons, surfaces, cylinders, cones, spheres. Numerical exercises in areas, volumes, weights. No cred.; no prereq.

(1) VI MTWF; 136E

(4) II MTWF; 215E

(2) VIII MWTh, VII T; 106E

(5) IX MWThF; 215E

(3) I MTWS; 136E

(6) IX MWThF; 203E

11f,su—Engineering Drawing (Mines). 2 cred.; prereq., solid geometry; III-IV MWF; 205M. Mr. Potter.

12w,su—Engineering Drawing (Mines). 2 cred.; prereq., 11; III-IV MWF; 205M. Mr. Potter.

13s,su—Topographic Drawing (Mines). 2 cred.; prereq., 12; III-IV MWF; 205M. Messrs. Levens and Potter.

14w,su—Descriptive Geometry (Mines). Not an engineering elective. 4 cred.; prereq., 13, M.&M. 13. Messrs. Eggers, Myers, and Levens.

Lect. I TThS; 107E

Lab. VII-IX M; 201E

21f,w,su—Drafting (C.E.). The application of descriptive geometry to drafting room problems including working drawings. 2 cred.; prereq., 3. Messrs. French, Myers, and Levens.

21f (1) I-II TThS; 201E

(2) VI-VII MWTh; 201E

21w III-IV MWF; 217E

22w,s,su—Structural Detailing (C.E.). Detail, assembly, and construction drawings of steel members and simple structures. Standards and conventions. 2 cred.; prereq., 21. Messrs. French, Myers, and Levens.

22w (1) I-II TThS; 201E

(2) VI-VII MWTh; 101E

22s I-II MWF; 201E

23s,su—Structural Detailing (C.E.). Drafting problems in general construction work including earthwork, wood, steel, and concrete. 2 cred.; prereq., 22 or reg. in 22. Messrs. French, Myers, and Levens.

23s (1) III-IV MWF; 201E

(2) VI-VII TThF; 201E

26w,s,su\*—Drafting (E.E.). Applications of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3. Messrs. Eggers and Quaid.

26w (1) VIII-IX MWF; 101E

(2) III-IV MF, I-II S; 415C

26s VIII-IX MWF; 1E

28f,w,su\*—Drafting (Aero.E.). Application of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3.

28f (1) VI-VII MWF; 417C

(3) VIII-IX TWF; 415C

(2) III-IV MWF; 1E

28w VI-VII TThF; 201E

29w,s,su—Drafting (Aero.E.). Detail, assembly, and layout drawings. Standard practices in the aircraft industry. Army and Navy standards and specifications; tolerances and allowances; graphical integration. 2 cred.; prereq., 28.

29w III-IV MFS; 101E

29s (1) VI-VII MTW; 101E

(3) VIII-IX MThF; 101E

(2) I-II TThS; 101E

\* For permissible substitute, see page 87.

- 34f,w,s,su—Lettering. Study and analysis of single stroke lettering with particular emphasis on the application to engineering drawing. 1 cred.; prereq., 1.
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|-----|----------------|-----------------|
| 34f | (1) IV T; 104E | (2) II Th; 215E |
| 34w | (1) IV T; 104E | (2) II Th; 104E |
| 34s | (1) IV T; 104E | (2) II Th; 21E  |
- 37f,w,s—Lettering for Engineers. Analysis of the alphabets. Exercises in roman and gothic lettering. Design and composition of the paragraph and the title. 2 cred.; prereq., 2; I WF; 1E(f), 201E(w), 217E(s). Mr. Schuck.
- 38w,s—Reading Drawings. Calculations and estimates of areas, volumes, and weights, and the tabulation of quantities from working drawings. Problems concerned with fabrication, manufacture, and construction. 2 cred.; prereq., 2; VI TF; 5E. Mr. Potter.
- 41f,w,s,su-42f,w,s,su-43f,w,s,su—Technical Drawing. (a) General course in the theory and practice of freehand drawing. Principles of perspective, sketching, renderings, conventions, lettering, and industrial drawing. (b) Modification of the above course of particular interest to dental, medical, and scientific students. 2 cred. per qtr.; no prereq. Mr. Doseff.
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|----------------------|-----------------------|
| (1) I-II MWF; 411C   | (3) VIII-IX MWF; 411C |
| (2) VI-VII MWF; 411C |                       |
- 44f,w,s,su—Lettering. Practical course in plain lettering. Not an engineering or architecture elective. 1 cred.; no prereq.
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|-----|----------------|-----------------|
| 44f | (1) IV T; 22E  | (2) II Th; 227E |
| 44w | (1) IV T; 21E  | (2) II Th; 206E |
| 44s | (1) IV T; 107E | (2) II Th; 205E |
- 45f,w,s—Alphabets. Construction and analysis of classic, and modern roman, italic, script, and gothic styles, including Old English. Exercises in composition. Reference work. Not an engineering or architecture elective. 2 cred.; soph., jr., sr.; prereq., 44; III TS; 7E. Messrs. Schuck and Teske.
- 50w,s—Diagrams and Charts. Elementary course dealing with the construction of simple diagrams and charts. 2 cred.; no prereq.; I TTh; 7E. Messrs. Eggers and Cruzen.
- 51f,w—Graphic Representation and Computation. Types of charts and applications to the solution of problems and equations. 3 cred.; prereq., 2, M.&M. 12; III MWF; 139EE(f), 7E(w). Messrs. Eggers and Levens.
- 52w,s—Alignment Charts. Functional scales. Application of geometry to the development of straight line alignment charts for equations of three or more variables. 3 cred.; prereq., 2, M.&M. 12; IV MWF; 138EE(w), 215E(s). Mr. Levens.
- 64w—Graphic Arts. Introduction. Field, development, and application in art and industry. Design and composition. Discussion of materials, style, and technique. 3 cred.; jr., sr.; prereq., 15 cred. in econ.; IV MWF; 206E. Mr. Doseff.
- 65f—Graphic Arts. Processes. Discussion of reproduction processes—letter press, planography, intaglio; also engravings, inks, paper stock, bindings, and miscellaneous printing operations. 3 cred.; jr., sr.; prereq., consent of major adviser in the Department of Journalism or in the School of Business Administration; IV MWF; 105MurH. Mr. Barnhart.
- 194s—Advanced Advertising Procedure. An advanced course conducted by means of laboratory work on problems and cases in (1) market research and (2) preparation of copy and layout. 3 cred.; sr., grad.; prereq., B.A. 88, Draw. 64, 65, Jour. 55, or permission of instructor; IV MWF; 206P. Mr. Vaile.

- 81f,w,s-82f,w,s-83f,w,s—Advanced Drawing. Principles of design—traditional and modern. Layouts, composition, and illustration. Black and white and color. Scientific modeling. 3 cred. per qtr.; prereq., 43 or equiv. Mr. Doseff.
- 86f,w,s-87f,w,s—Anatomical Drawing. 3 cred. per qtr.; prereq., 43 or equiv. Mr. Doseff.
- 111f-112w-113s—Advanced Descriptive Geometry. Parallel and central projections. Curves and surfaces. Intersections and tangencies. Shades and shadows. Warped surfaces. The figure plan. 3 cred. per qtr.; prereq., 3, calculus. Messrs. Eggers and Levens.
- 115f-116w-117s—Curve Fitting. Finite differences and their application to curve fitting; graduation of experimental data; interpolation; fitting of data to type forms of curves. 3 cred. per qtr.; prereq., M.&M. 25; ar. Mr. Eggers.
- 118f,s—Short Course in Curve Fitting. Derivation of formulae to fit experimental data. Combination of graphical and analytic methods. 3 cred.; prereq., 3, M.&M. 25, or permission; IV MWF; 206E(f), 22E(s). Mr. Eggers.
- 152f-153w-154s—Nomography. Application of geometry to the development of alignment charts involving curved and straight line scales. Networks; combination of networks and alignment charts. Line co-ordinates. Use of determinants for the construction of alignment charts. Special rules. 3 cred.; prereq., 52 or equiv., M.&M. 25. Mr. Levens.
- 152f IV TS, 5E; VI Th, 7E  
153w-154s IV TS, VI Th; 7E
- 157f-158w-159s—Graphical Mathematics. Graphical calculus. Polar diagram method of stress analysis. 2 cred. per qtr.; prereq., M.&M. 26. Messrs. French, Eggers, and Levens.
- 157f IV MW; 205E  
158w IV MF; 21E  
159s I TS; 107E

## ECONOMICS AND BUSINESS ADMINISTRATION

### ECONOMICS

- 3f,w,s—Elements of Money and Banking. Basic principles of money and a description of the various types of financial institutions, their functions and relations to the whole economic organization. 5 cred.; no prereq. Mr. Stehman and others.
- 3f Lect. II TTh; JAud  
Rec. (1) I MWF; 205VH (4) III TThS; 113VH  
(2) II MWF; 211VH (5) V MWF; 2VH  
(3) III MWF; 2VH (6) VII MWF; 113VH
- 3w Lect. III TTh; BuAud  
Rec. (1) I MWF; 211VH (8) IV MWF; 200Pt  
(2) I MWF; 105VH (9) IV MWF; 2VH  
(3) II MWF; 221VH (10) V MWF; 301VH  
(4) II MWF; 101F (11) VI MWF; 221VH  
(5) II TThS; 301VH (12) VI MWF; 205VH  
(6) III MWF; 113VH (13) VII MWF; 205VH  
(7) III MWF; 205VH
- 3s Lect. IV MW; 150Ph  
Rec. (1) I MWF; 2VH (4) VI MWF; 4VH  
(2) III MWF; 211VH (5) VII MWF; 205VH  
(3) III TThS; 6VH



5f,w,s†—Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material. 5 cred.; no prereq. Mr. Kozelka and others.

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|----|-------------------------|-----------------------|
| 5f | Lect. III M; JAud       |                       |
|    | Rec. (1) I MWThF; 301VH | (4) V MTWF; 205VH     |
|    | (2) III TWThF; 301VH    | (5) VI MWThF; 210VH   |
|    | (3) IV MTWF; 205VH      |                       |
| 5w | Lect. III M; JAud       |                       |
|    | Rec. (1) I MWThF; 221VH | (3) VI MWThF; 113VH   |
|    | (2) IV MTWF; 4VH        |                       |
| 5s | Lect. III T; BuAud      |                       |
|    | Rec. (1) I MWThF; 115VH | (7) IV MTWF; 210VH    |
|    | (2) I MWThF; 211VH      | (8) IV MTWF; 113VH    |
|    | (3) II MWThF; 113VH     | (9) V MTWF; 115VH     |
|    | (4) II MWThF; 221VH     | (10) VI MWThF; 205VH  |
|    | (5) III MWThF; 112VH    | (11) VI MWThF; 112VH  |
|    | (6) III MWThF; 113VH    | (12) VII MWThF; 211VH |

8f,w-9w,s—General Economics. (Engrs., arch., chem.) Principles of economics with special emphasis upon their application to current problems such as money, banking, conservation, insurance, international commerce, monopolies, transportation, labor, socialism and public ownership, and finance. 3 cred. per qtr.; no prereq. Mr. Filipetti and others.

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|-------|-----------------------------|--------------------------------|
| 8f-9w | (1) I MWF; 211VH(f) 26EE(w) | (3) III MWF; 211VH (fall only) |
|       | (2) II MWF; 210VH           | (4) IV MWF; 211VH              |
| 8w-9s | III TThS; 211VH             |                                |

20f,w,s—Elements of Accounting. Fundamental principles underlying bookkeeping and accounting. Sufficient practice in technical processes will be given to serve as a background for more advanced work. Preparation and analysis of statements. Open only to engineering prebusiness students. Other engineering students register in 29 or B.A. 54. 3 cred.; no prereq. Mr. Heilman and others.

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| 20f | (1) I MWF; 210VH   | (7) III TThS; 221VH |
|     | (2) I TThS; 221VH  | (8) IV MWF; 307VH   |
|     | (3) II MWF; 307VH  | (9) IV MWF; 301VH   |
|     | (4) II TThS; 301VH | (10) V MWF; 221VH   |
|     | (5) III MWF; 113VH | (11) VI MWF; 221VH  |
|     | (6) III MWF; 210VH | (12) VII MWF; 221VH |
| 20w | (1) I MWF; 210VH   | (4) IV MWF; 301VH   |
|     | (2) II MWF; 307VH  | (5) V MWF; 307VH    |
|     | (3) III MWF; 211VH | (6) VI MWF; 210VH   |
| 20s | (1) I MWF; 221VH   | (4) III TThS; 205VH |
|     | (2) II MWF; 307VH  | (5) IV MWF; 115VH   |
|     | (3) III MWF; 205VH | (6) VII MWF; 307VH  |

25f,w,s-26f,w,s—Principles of Accounting. Course following Econ. 20 presenting the principles underlying the accounting statements, the accounts, principles of valuation, depreciation, preparation and analysis of statements. 3 cred. per qtr.; prereq., 20. Mr. Heilman and others.

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| 25f-26w | (1) II TThS; 307VH  | (3) VII MWF; 211VH               |
|         | (2) III TThS; 205VH |                                  |
| 25w-26s | (1) I MWF; 301VH    | (5) III MWF; 307VH (winter only) |
|         | (2) II MWF; 301VH   | (6) IV MWF; 307VH (winter only)  |
|         | (3) II TThS; 211VH  | (7) VI MWF; 307VH                |
|         | (4) III MWF; 301VH  | (8) VII MWF; 1VH (winter only)   |

† Not open to students who have received credit in Soc. 45 or B.A. 70.

- 25s (1) I MWF; 210VH (3) V MWF; 307VH  
(2) II TThS; 210VH
- 26f (1) I MWF; 307VH (2) VII MWF; 301VH
- 28f,s—Business Law. Business law arranged for engineers, including the law of contracts, real estate agency, partnership, corporations, negotiable instruments. 3 cred.; 3rd qtr. soph., jr., sr.; I MWF; 135E(f), 335EE(s). Mr. Palmer.
- 29f,s—Principles of Accounting. (Engrs., arch., chem.) Purpose and principles of account classification; capital and revenue, accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements. 3 hrs. of lect. a week. 3 cred.; no prereq. Mr. Lund.
- 29f IV MWF; 112VH  
29s I MWF; 307VH
- 149f,w,s—Business Cycles. Analysis of factors involved in business fluctuations. Comparison of theories of the cause of prosperity and depression. Introduction to the statistical data and methods of business forecasting. 3 cred.; sr., grad.; prereq., 141 or B.A. 142. Mr. Marget.
- 149f III TThS; 1VH  
149w (1) I MWF; 1VH (2) VI MWF; 6VH  
149s (1) II TThS; 6VH (2) VI MWF; 105VH
- 161f,w,s—Labor Problems and Trade Unionism. Discussion of employment; hours; wages; extent and strongholds of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. 3 cred.; prereq., 8, 9. Messrs. Yoder and Schmidt.
- 161f (1) III MWF; 4VH (2) IV MWF; 4VH  
161w (1) I TThS; 207VH (2) II MWF; 4VH  
161s (1) I TThS; 207VH (2) IV MWF; 1VH

## BUSINESS ADMINISTRATION

- 51f-52w-53s—Business Law.\* 51. Contracts. 52. Agency, Partnership, Corporations. 53. Sales and Negotiable Instruments. 3 cred. per qtr.; jr., sr.; prereq., for 51, Econ. 8 and 9, for 52 and 53, B.A. 51. Messrs. Gray and Wattson.
- Lect. IV T; BuAud  
Rec. (1) I ThS; 4VH (4) II ThS; 2VH  
(2) I ThS; 2VH (5) III ThS; 4VH  
(3) II ThS; 4VH
- 54f-55w—Elementary Accounting. Combined course. Covers the same material as Econ. 20, 25, and 26, or Econ. 29 and 26. Recommended for five-year engineering business students. Mr. Miller.
- 54f (1) V MTWF; 207VH (2) VII MTWF; 207VH  
55w V MTWF; 207VH
- 58f,w,s§—Elements of Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens. Condensed course given especially for business administration students. 3 cred.; jr., sr.; prereq., Econ. 8, 9. Messrs. Blakey and Borak.
- (1) IV MWF; 207VH (2) VI MWF; 207VH

\* No credit will be given for 51, 52, or 53 until all three are completed.

§ Credit may not be received for both Econ. 191-192 and B.A. 58.

70f†—Statistics Survey Course. Tools and devices which facilitate the use of business data. Statistical information is collected by questionnaires, consolidated into tables, summarized in averages, and illustrated by graphic devices. Current index numbers are compared in form and application. Interpretation and limitations of statistical data. 3 cred.; prereq., Econ. 8, 9. Messrs. Gaumnitz and Graves.

- (1) I MWF; 6VH (3) VII MWF; 6VH  
(2) II MWF; 105VH

71f,w,s—Transportation: Services and Charges I. Survey of rail, highway, and water transportation facilities, services, and rates. Current transportation problems. 3 cred.; prereq., Econ. 8, 9. Mr. Nightingale.

- 71f (1) I MWF; 1VH (3) VI MWF; 1VH  
(2) II MWF; 1VH  
71w (1) III TThS; 1VH (2) VI MWF; 1VH  
71s (1) III MWF; 1VH (2) VI MWF; 113VH

72w,s—Transportation: Services and Charges II. Principles, construction, interpretation, and use of rail, highway, and water classifications, rates, and tariffs for handling freight, express, and mail shipments. Audit of transportation charges. Adjustment of rates, rules, and regulations. 3 cred.; prereq., 71. Mr. Nightingale.

- 72w VIII MWF; 1VH  
72s I MWF; 112VH

77f,w,s—Survey of Marketing. (An introductory course.) The principles of production economics and of price as illustrated in marketing. Commodity classifications, market functions, description of market organizations. 3 cred.; jr., sr.; no prereq. Messrs. Vaile, Chute, Pickett, and Miss Canoyer.

- 77f,s Lect. I TTh; 1VH  
77w Lect. IV MW; 1VH  
77f Rec. (1) I S; 1VH (3) VII T; 1VH  
(2) I S; 6VH  
77w Rec. (1) IV F; 1VH (3) VII T; 1VH  
(2) VI T; 2VH  
77s Rec. (1) I S; 1VH (3) VII T; 1VH  
(2) I S; 112VH

89f,w,s—Production Management. Analysis of the procedure and methods of production in industrial plants, the factors involved in production management, the means of effecting control. 3 cred.; prereq., Econ. 8, 9. Messrs. Filipetti and Cummins.

- 89f (1) II MWF; 4VH (2) III TThS; 207VH  
89w (1) II MWF; 6VH (2) III MWF; 1VH  
89s (1) I MWF; 1VH (2) II MWF; 207VH

91f,w,s—Tabulating Equipment Laboratory. Use of tabulating equipment in preparation of sales analyses and the laying out of production programs, in the keeping of perpetual inventory records and in making distributions of labor and overhead costs in cost accounting. 1 cred.; jr., sr.; prereq., Econ. 26 and either 5 or B.A. 70. Mr. Gaumnitz.

- 91f (1) IV-V T; 2VH (2) VIII-IX F; 2VH  
91w IV-V T; 6VH  
91s (1) IV-V T; 2VH (2) VIII-IX M; 2VH

† Not open to students who have received credit in Econ. 5.

101f,w-102w,s§—Advanced General Economics. A study of some of the more important theoretical problems of economics; competitive and monopoly prices; equilibrium prices and costs; theories of valuation of producers' goods; capital earnings and interest rates; profits. 3 cred. per qtr.; sr.; prereq., Econ. 8, 9. Messrs. Garver, Mudgett, Boddy, and Stigler.

101f-102w	(1) I TThS; 105VH	(4) III MWF; 105VH
	(2) II MWF; 2VH	(5) IV MWF; 113VH
	(3) II TThS; 6VH	(6) VII MWF; 105VH
101w-102s	(1) I TThS; 6VH	(2) VII MWF; 6VH

112f,w,s‡—Business Statistics. Survey and criticism of methods used in analyzing time series, with special applications to the study of cyclical fluctuations of economic phenomena. 3 cred.; jr., sr., grad.; prereq., Econ. 5 or B.A. 70. Messrs. Mudgett, Kozelka, and others.

112f	(1) I TThS; 207VH	(3) VI MWF; 6VH
	(2) IV MWF; 105VH	
112w	(1) I TThS; 205VH	(3) III TThS; 221VH
	(2) II MWF; 205VH	
112s	(1) II MWF; 6VH	(3) VI MWF; 2VH
	(2) II TThS; 205VH	

130f,s—Cost Accounting Survey. (General survey.) 3 cred.; prereq., Econ. 26, 29 or 55. Mr. Ostlund.

130f	I MWF; 105VH
130s	I TThS; 105VH

133s—Cost Accounting Methods. Standard costs. The establishment of standards and their results as reflected in the cost accounts. The application of standards in distribution. 3 cred.; jr., sr., grad.; prereq., B.A. 130 or 152, 153; II TThS; 301VH. Mr. Ostlund.

139f,w,s‡—Advanced General Accounting. A course intended particularly for the general student of business. Interpretation of accounts and statements, statement preparation, and analysis. Utilization of the statements by the executive. The use of budgets in business. Accounting methods and statements in a number of business fields. 3 cred.; jr., sr., grad.; prereq., Econ. 25, 26. Mr. Heilman and others.

139f	IV MWF; 1VH	
139w	(1) I MWF; 4VH	(2) III TThS; 113VH
139s	(1) III TThS; 1VH	(2) IV MWF; 6VH

142f,w,s—Advanced Money and Banking. 3 cred.; jr., sr., grad.; prereq., Econ. 8, 9. Messrs. Marget, Uppgren, and Myers.

142f	(1) II MWF; 6VH	(3) VI MWF; 2VH
	(2) II TThS; 105VH	
142w	(1) II TThS; 105VH	(2) IV MWF; 6VH
142s	(1) I MWF; 105VH	(3) VI MWF; 6VH
	(2) III TThS; 105VH	

155f,w,s—Corporation Finance. 3 cred.; prereq., Econ. 8, 9. Messrs. Stehman and Uppgren.

155f	(1) III MWF; 1VH	(2) III TThS; 105VH
155w	(1) I TThS; 1VH	(2) III MWF; 4VH
155s	(1) II TThS; 207VH	(2) IV MWF; 4VH

‡ A fee of \$1 per quarter is charged for this course.

§ The entire course must be completed before credit is received for any quarter.

165f,w,s—Economics of Public Utilities. Economic and legal bases of classification. Relative advantages of public ownership and regulation. Central and municipal regulation. Basis of rates; relative rates; rates and service. Theories of valuation. 3 cred.; prereq., 8, 9. Messrs. Garver and Schmidt.

165f	(1) I TThS; 211VH	(2) III TThS; 6VH
165w	(1) I TThS; 211VH	(2) III TThS; 207VH
165s	(1) I MWF; 4VH	(2) II MWF; 1VH

167f,w—Personnel Administration. Managerial policy for various types of organization of labor. Job analysis, employment, incentives, and regulation of employment. 3 cred.; prereq., Econ. 161. Mr. Yoder.

167f	II MWF; 205VH
167w	III TThS; 105VH

180f-181wC—Senior Topics: Marketing. Selected topics in industrial marketing industry. (1) Market research; (2) marketing of installations; (3) product design as an aid in marketing; (4) market prices and price policies. 3 cred. per qtr.; prereq., consent of adviser. VI½-VII TTh; 4VH. Mr. Vaile.

180f-181w§-182sG—Senior Topics: Production Management. Selected problems in management; technique of executive control in manufacturing enterprises; field research and surveys in organization and management of Northwest industrial concerns. 9 cred.; prereq., B.A. 89, 130; VII MWF; 1VH(f), 115VH(w,s). Mr. Filipetti.

184f§—Scientific Management in Industry. 3 cred.; prereq., 8, 9; VI MWF; 301VH. Mr. Filipetti.

(For other courses see Combined Class Schedule for 1941-42, School of Business Administration section.)

## ELECTRICAL ENGINEERING†

11f-13w-15s—Elements of Electrical Engineering. Introduction to the development, principles, materials, safety, and general applications of electrical engineering. 3 cred. per qtr.; prereq., reg. in phys., and M.&M. 24 or 11; reg. in M.&M. 25 for 13.

11f	Lect. (1) III TThS; 138EE	(3) I TThS; 138EE
	(2) I TThS; 238EE	
13w	Lect. (1) I TThS; 238EE	(3) III TThS; 138EE
	(2) I TThS; 36EE	
15s	Lect. (1) III TThS; 237EE	(3) I TThS; 36EE
	(2) I TThS; 238EE	

14w-16s—Elements of Electrical Engineering Laboratory. Taken with courses E.E. 13, 15. 1 cred.; prereq., for 14, 13 or reg. in 13; for 16, 14 and reg. in 15.

14w	(1) VI-VII M; 21EE	(4) VIII-IX T; 21EE
	(2) VIII-IX Th; 21EE	(5) VI-VII Th; 21EE
	(3) V-VI T; 21EE	(6) VIII-IX F; 21EE
16s	(1) VIII-IX M; 21EE	(4) VIII-IX Th; 21EE
	(2) VI-VII W; 21EE	(5) VI-VII M; 21E
	(3) VIII-IX T; 21EE	(6) VI-VII T; 21E

111f—Junior Electrical Engineering. Alternating current circuits and machinery. 5 cred.; prereq., 15, 16.

(1) I MTWFS; 237EE	(2) II MTWFS; 237EE
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† In courses continuing through three quarters, the work of each quarter is prerequisite for the following quarters.

§ Credit may not be received for both B.A. 181G and B.A. 184.

112f—Junior Electrical Engineering Laboratory. Taken with Course 111. Experimental study of alternating current circuits and machinery. 2 cred.; prereq., reg. in 111.

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| (1) VI-IX M; 107EE | (4) VI-IX Th; 107EE |
| (2) VI-IX T; 107EE | (5) VI-IX F; 107EE  |
| (3) VI-IX W; 107EE |                     |

113w-115s\*—Junior Electrical Engineering. Alternating current circuits and machinery. 3 cred. per qtr.; prereq., 111, 112 for 113; and 113, 114 for 115.

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| (1) I MWF; 237EE | (2) II MWF; 237EE |
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114w-116s—Junior Electrical Engineering Laboratory. Taken with Course 113-115. Experimental study of alternating current circuits and machinery. 1 cred. per qtr.; prereq., reg. in 113-115. Lab. given alternate weeks.

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| (1) VI-IX M; 107EE | (4) VI-IX Th; 107EE |
| (2) VI-IX T; 107EE | (5) VI-IX F; 107EE  |
| (3) VI-IX W; 107EE |                     |

117w-119s\*—Engineering Electronics. Fundamental theory of electronic devices. 3 cred. per qtr.; prereq., 111, 112 for 117, and 117 for 119. Lab. given in alternate weeks.

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| Lect. (1) I TTh; 237EE  | (2) II TTh; 237EE   |
| Lab. (1) VI-IX M; 227EE | (4) VI-IX Th; 227EE |
| (2) VI-IX T; 227EE      | (5) VI-IX F; 227EE  |
| (3) VI-IX W; 227EE      |                     |

121f-123w-125s—Senior Electrical Engineering. Theory of alternating and direct current machinery. 3 cred. per qtr.; prereq., 115, 116, and 119.

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| (1) III MWF; 237EE | (2) IV MWF; 237EE |
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122f-124w-126s—Senior Electrical Engineering Laboratory. Operating characteristics of alternating and direct current machinery. 2 cred. per qtr.; prereq., 116 and reg. in 121-123-125.

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| (1) VI-IX T; 107EE | (3) VI-IX Th; 107EE |
| (2) VI-IX W; 107EE | (4) VI-IX F; 107EE  |

127f-128w-129s—Transient Electrical Phenomena. Mathematical study of electric circuits during sudden changes of conditions. Classical and operational methods of analysis applied to electric circuits and machines, and use of the oscillograph in the analysis of these problems. 3 cred. per qtr.; prereq., reg. in 121-123-125; I TTh, 139EE; VI-VIII W, 129EE. Messrs. Bryant and Johnson.

227f-228w-229s—Transients in Electrical Machinery and Transmission Lines. Theoretical and laboratory study of transients in electrical power machinery and of lightning surges and lightning protection. 3 cred. per qtr.; prereq., 127-128-129. Mr. Bryant.

255f-256w-257s—Electrical Engineering Applications. Investigation of electrical engineering applications. Laboratory study, library study, research both in residence and in the field, followed by complete written reports with oral presentation and discussion. 1 to 3 cred. per qtr.; prereq., graduate students only. Messrs. Bryant and Johnson.

\* Students registering in E.E. 113w and 117w and E.E. 115s and 119s must take both courses at the same hour of the day. The laboratory part of 117w and 119s must be taken on the same day that the student registers for E.E. 113w and 115s. These laboratory courses are given in alternate weeks.

## DESIGN

- 130s—Electric Control. Study of methods of control and control devices for direct and alternating current motors and generators. Open to aeronautical, chemical, electrical, and mechanical engineers. 2 cred.; prereq., 37, 44, 46 or 123. Mr. Kuhlmann.
- 132f-134w-136s—Electrical Design. The design of direct current generators and motors, alternating current transformers, generators, and synchronous motors. 2 cred. per qtr.; prereq., for 132, reg. in 121; 134, reg. in 123; 136, reg. in 125; II TTh; 335EE. Mr. Kuhlmann.
- 197f-198w-199s—Electrical Design. Special problems. 2 cred. per qtr.; prereq., 132-134-136. Mr. Kuhlmann.

## ELECTRIC POWER FOR NONELECTRICAL STUDENTS

- 36f-37w-38s—Electric Power. Similar to 43-44-45. 3 cred. per qtr.; sr. M.E.; prereq., Phys. 9.

36f	Lect. (1) III MF; 335EE	(2) III MF; 138EE
	Lab. (1) VI-VII M; 107EE	(4) VIII-IX M; 107EE
	(2) III-IV S; 107EE	(5) I-II T; 107EE
	(3) I-II S; 107EE	
37w	Lect. (1) III MF; 335EE	(2) III MF; 138EE
	Lab. (1) II-III W; 107EE	(4) II-III Th; 107EE
	(2) III-IV S; 107EE	(5) III-IV T; 107EE
	(3) I-II S; 107EE	
38s	Lect. (1) II MF; 238EE	(2) II MF; 138EE
	Lab. (1) II-III W; 107EE	(4) III-IV S; 107EE
	(2) III-IV F; 107EE	(5) III-IV T; 107EE
	(3) I-II Th; 107EE	

- 40f—Electric Wiring and Equipment. Elements of direct and alternating current circuits. Interior wiring and electrical equipment of buildings. Elements of illumination. 2 cred.; sr. arch.; no prereq.; I MW; 139EE.

- 41s—Electric Power. Elementary principles of continuous and alternating currents, generators, and motors; transmission and distribution. Measurement of power. 3 cred.; jr. mines; prereq., Phys. 8.

Lect. I TTh; 138EE  
Lab. VII-IX F; 107EE

- 42s—Electric Power. Similar to 41. 3 cred.; sr. C.E.; prereq., Phys. 9; III MWF; 138EE.

- 43f-44w-45s—Electric Power. Elementary study of the generation, distribution, measurement, and utilization of electric power. 3 cred. per qtr.; sr. Chem.E.; prereq., Phys. 9.

	Lect. (1) III TTh; 335EE	(2) III TTh; 238EE
43f	Lab. (1) III-IV W; 107EE	(3) III-IV M; 107EE
	(2) IV-V T; 107EE	(4) IV-V F; 107EE
44w	Lab. (1) III-IV M; 107EE	(3) I-II T; 107EE
	(2) III-IV F; 107EE	(4) IV-V W; 107EE
45s	Lab. (1) III-IV M; 107EE	(3) I-II T; 107EE
	(2) I-II F; 107EE	(4) I-II S; 107EE

46f-47w—Electric Power and Aeronautic Radio. Fundamentals of direct current and alternating current circuits, tubes, direction finding, and blind landing. 3 cred. per qtr.; prereq., sr. Aero.E., Phys. 9.

Lect. VI TTh; 335EE

46f	Lab. (1) I-II F; 107EE	(3) I-II W; 107EE
	(2) I-II Th; 107EE	(4) I-II M; 107EE
47w	Lab. (1) III-IV M; 227EE	(3) III-IV W; 227EE
	(2) II-III Th; 227EE	(4) III-IV F; 227EE

48s—Aeronautic Radio Developments. Study of radio aids for the operation of aircraft. Direction finding, instrument landing systems, ultra-high-frequency applications, television, and radiosonde equipment. 2 cred.; prereq., 47 or by permission. VI MF; 237EE. Mr. Bauer.

#### POWER AND CENTRAL STATION ENGINEERING

138f-139w-140s—Power Systems. Short-circuit currents in power networks; unbalanced loads in polyphase circuits, transformers and motors; harmonics; stability of power systems under steady state conditions. Application of relay, oil circuit breakers, and lightning arresters to power systems for protection of apparatus and service. 3 cred. per qtr.; prereq., reg. in 121, 123, or 125; II MWF; 339EE. Messrs. Bryant, Johnson, and Caverley.

141f—Central Stations. Electric power generating stations and distribution systems. Economic considerations. Costs, load curves, plant location, selection of prime movers, station equipment. 3 cred.; prereq., reg. in 121; III TThS; 237EE. Mr. Johnson.

142w—Electrical Transmission. Considerations involved in the designing and building of transmission lines. Mechanical, electrical, and economic considerations. Lightning protection, underground lines, high-voltage direct current transmission. 3 cred.; prereq., reg. in 123; III TThS; 237EE. Mr. Johnson.

143s—Valuation of Public Utilities Properties. Factors affecting value, depreciation, taxation, and regulation of public utilities properties. Elements of engineering economics; cost analysis, economic investigations, rate making. 3 cred.; sr. and grad. only; III TThS; 339EE. Messrs. Bryant and Johnson.

144s—Power Transmission Line Design. Preparation of detailed plans and specifications for construction of high voltage transmission lines and distributing systems. 3 cred.; prereq., 134, 142. Mr. Johnson.

145w—Railway Electrical Engineering. Principles of mechanics applied to electric train movements. 2 cred.; prereq., 42 or 45 or 48 or 115; IV TS; 237EE. Mr. Johnson.

146s—Railroad Electrification. Reasons for electrification. Study of European and American systems. Results of electrification. 2 cred.; prereq., 144; IV TS; 339EE. Mr. Johnson.

#### ILLUMINATING ENGINEERING

151f—Illuminating Engineering. Nature of light. Laws of vision. Principles of illumination. Photometry. Sources of light and their characteristics. Lighting equipment. Illumination requirements and calculation for various fields of use. 2 cred.; prereq., Phys. 9; IV TS; 237EE. Mr. Johnson.



- 152f—Photometric Laboratory. Photometer practice. Distribution curves of lamps and reflectors. Measurement of lighting installations. 1 cred.; prereq., reg. in 151; VI-VII Th; ar. Mr. Johnson.
- 153w-154s—Illumination Problems. Illumination design and specifications applied to problems in street, residence, industrial, commercial, and other kinds of lighting. 1 to 3 cred. per qtr.; prereq., 151. Mr. Johnson.
- 251w-253s—Illuminating Engineering. Lectures and laboratory work. Methods of determining locations, kind and quality of lights for obtaining desired illumination. 2 cred. per qtr.; prereq., 151. Mr. Johnson.

## TELEPHONE AND TELEGRAPH ENGINEERING

- 64f-65w-66s—Elements of Communication. Theoretical and laboratory study of communication circuits and apparatus. Simplex, duplex, multiplex telegraph systems. Speed of transmission. Magneto, common battery, manual, automatic telephone systems. 2 cred. per qtr.; prereq., reg. in 111-113-115. Mr. Becklund.
- Lect. III M; 238EE  
 Lab. (1) VI-VII T; 307EE (3) VI-VII W; 307EE  
 (2) VIII-IX T; 307EE (4) VIII-IX W; 307EE
- 164f-165w-166s—Electric Communication. Telephone circuits at audio and carrier frequencies. Theoretical and laboratory study of circuits having distributed constants. Use of hyperbolic functions. Wave filters, balancing networks, equalizers, repeaters. 4 cred. per qtr.; prereq., 66. Mr. Hartig.
- Lect. I MW; 138EE  
 Lab. (1) VI-IX Th; 307EE (2) VI-IX F; 307EE
- 267f-268w-269s—Telephone Transmission. Advanced transmission theory at communication frequencies. Class and laboratory. 2 or 3 cred.; reg. by permission. Mr. Hartig.
- 272f-273w-274s—Electromechanical Vibrating Systems and Engineering Acoustics. Theoretical discussion of the production of sound by electrically driven vibrating systems, sound transmission, reflection, absorption. Laboratory study of vibrating systems, pipes, horns, absorbing materials, sound pressure, articulation, reverberation, resonance, sound filters. 3 cred.; open to grad. and sr. by permission; prereq., M.&M. 151. Mr. Hartig.
- 287f-288w-289s—Advanced Communication Laboratory and Seminar. Special problems in communication. Study and discussion of current articles on communication. 2 or 3 cred.; reg. by permission. Mr. Hartig.

## RADIO ENGINEERING

- 161f-162w-163s—Radio Communication. Theoretical and laboratory study of radio transmitting and receiving circuits and apparatus. Amplifiers, detectors, oscillators. Electromagnetic waves in free space and on antenna systems. 3 cred. per qtr.; prereq., reg. in 121-123-125. Mr. Webb.
- Lect. II MW; 335EE  
 Lab. (1) VI-VII M; 308EE (3) VI-VII T; 308EE  
 (2) VIII-IX M; 308EE (4) VIII-IX T; 308EE
- 167f—Radio Transmission. Design and operation of modern transmitting equipment, with special emphasis on broadcast transmission. Registration by permission of instructor. 3 cred. Mr. Webb.
- Lect. II TTh; 339EE  
 Lab. (1) VI-VIII W; 308EE (2) VI-VIII Th; 308EE

168w-169s—Problems in Radio Receiver Design. Detailed study of the problems arising in broadcast receiver design. Registration by permission of instructor. 3 cred. per qtr. Mr. Webb.

Lect. II TTh; 339EE

Lab. (1) VI-VIII W; 308EE

(2) VI-VIII Th; 308EE

176f-177w-178s—Electronics. Theoretical and laboratory study of the following subjects with aspects of their engineering applications. Electron emission from hot bodies, Richardson's equation, Langmuir-Childs' equation, secondary electron emission, ionization and resonance potentials, external and internal photoelectric effect, positive ion emission, shot effect, discharge of electricity through gases, "getter" action, vacuum gages, vacuum technic, etc. 2 cred. per qtr.; graduate course, open to seniors by permission of instructor. Mr. Webb.

261f-263w-265s—Advanced Radio Communication. Theoretical study of the transmission of electromagnetic waves. Design and testing of radio transmitting and receiving apparatus. Theory of electron tubes and their use in radio circuits. High frequency measurements. Taken with 262-264-266. 2 cred. per qtr.; reg. by permission. Mr. Webb.

262f-264w-266s—Advanced Radio Laboratory. Special problems in radio laboratory and station, usually taken in connection with Course 261-263-265. For students specializing in electrical communication. 1 or more cred. per qtr.; reg. by permission. Mr. Webb.

#### RESEARCH

171w-172s—Undergraduate Thesis. Investigation of some approved problem in electrical engineering. 3 to 6 cred. per qtr.; prereq., 121.

275f-276w-277s—Electrical Engineering Research. Investigation of special problems in laboratory or library. 2 to 6 cred. per qtr.; grad.

#### MEASUREMENT

81w—Electrical Engineering Measurements. Principles of electrical measuring instruments, construction, limitations, sources of error, methods of calibration. Methods of measuring voltage, current, watts, watt hours, resistance inductance, mutual inductance, capacity. 3 cred.; prereq., 111. Mr. Todd.

Lect. IV MW; 339EE

Lab. VI-VII M; 107EE

173f-174w-175s—High Voltage Engineering. Study of insulation and generating equipment for high voltage; measurements of electrical quantities at high voltage; surges, and surge proof equipment. Lecture and laboratory. 2 or 3 cred.; sr. or grad. Mr. Caverley.

181s—Communication Frequency Measurements. Vector treatment of network. Bridge circuits for measuring of resistance, inductance, and capacity of audio and radio frequencies. 2 cred.; prereq., 126.

183f-184w-185s—Special Electrical Laboratory. Efficiency tests and special problems. 1 to 3 cred. per qtr.; prereq., jr., sr., grad. by permission.

187f-188w-189s—Special Communication Laboratory. Special problems in electrical communication. Includes a weekly seminar meeting. 1 to 3 cred. per qtr.; jr., sr., grad. by permission.

281w-282s—Advanced High Frequency Measurements. Vector treatment of circuit networks. Bridge circuits for the measurement of resistance, inductance, and capacity of audio and radio frequencies. 2 cred. per qtr.; prereq., 126.

284f-285w-286s—Precise Electrical Engineering Measurements. Measurements of resistance, voltage, current, energy, self-induction, and capacity; standardization of measuring instruments. 2 cred. per qtr.; prereq., 122.

## GENERAL

- 93s—Seminar. Weekly discussion of current engineering periodicals and reports on assigned topics. 1 cred.; no prereq., jr. E.E. (Not offered in 1941-42.)
- 100—Inspection Trip. Inspection of selected industrial plants made in the spring vacation period. 2 cred.; required of senior E.E.
- 156s—Vacuum Tube and Control Devices. Two, three, four, and five electrode vacuum tubes. Thyatron, kenotron, grid glow, photoelectric tubes, etc. Theoretical study of apparatus and circuits with demonstrations. 2 cred.; sr. only; not open to students having credit in 161; IV MW; 139EE. Mr. Webb.
- 191f-192w-193s—Seminar. Weekly discussion of current electrical periodicals. 1 or 2 cred. per qtr.; prereq., 111.
- 194f-195w-196s—Vacuum Tube Applications. Study of commercial thermionic vacuum, vapor, and gas discharge tubes including an extensive survey and detailed study of their scientific and industrial applications. 3 cred. per qtr.; open to grad. and sr. in E.E. by permission of instructor.
- 211f-212w-213s—Advanced Circuit Analysis. Circuit analysis using Heaviside's *Operational Calculus*. 2 cred. per qtr.; grad.; prereq., M.&M. 151.
- 291f-292w-293s—Graduate Seminar. Discussion problems and results of research work. 1 cred. per qtr.
- 294f-295w-296s—Vacuum Tube Circuit Analysis. Continuation of 196. Mathematical and experimental analysis of circuits associated commonly with vacuum tubes. 3 cred. per qtr.; grad. only; prereq., 196.

## ENGLISH (ENGINEERING)

4f,w-5w,s-6f,s—Composition. Review of grammar; principles of composition; constant practice in elementary technical exposition. Reading. 3 cred. per qtr.; prereq., placement test. Messrs. Richardson, Becklund, Fitch, Guthrie, and Lefevre.

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|----|---------------------|---------------------|
| 4f | (1) IV MWF; 107E    | (10) VI MWF; 107E   |
|    | (2) IV MWF; 22E     | (11) VI MWF; 104E   |
|    | (3) IV MWF; 104E    | (12) I MWF; 7E      |
|    | (4) III MTF; 107E   | (13) I MWF; 21E     |
|    | (5) III MTF; 5E     | (14) I MWF; 5E      |
|    | (6) III MTF; 4E     | (15) VII MWF; 107E  |
|    | (7) VIII MWTh; 205E | (16) VII MWF; 215E  |
|    | (8) VIII MWTh; 107E | (17) VII MWF; 7E    |
|    | (9) VIII MWTh; 203E |                     |
| 4w | (1) I MWF; 5E       | (4) VIII MWF; 104E  |
|    | (2) V MWF; 107E     | (5) VIII MWF; 205E  |
|    | (3) V MWF; 206E     |                     |
| 5w | (1) IV MWF; 107E    | (9) VIII MWTh; 106E |
|    | (2) IV MWF; 215E    | (10) VI MWF; 107E   |
|    | (3) IV MWF; 135E    | (11) VI MWF; 203E   |
|    | (4) IV MWF; 104E    | (12) VI MWF; 215E   |
|    | (5) III MTF; 3E     | (13) I MWF; 107E    |
|    | (6) III MTF; 107E   | (14) I MWF; 135E    |
|    | (7) III MTF; 203E   | (15) VII MWF; 107E  |
|    | (8) VIII MWTh; 107E | (16) VII MWF; 203E  |

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| 5s | (1) VIII MWF; 203E | (4) V MWF; 106E     |
|    | (2) VIII MWF; 205E | (5) V MWF; 203E     |
|    | (3) V MWF; 107E    |                     |
| 6f | (1) I MWF; 107E    | (2) V MWF; 107E     |
| 6s | (1) III MThF; 107E | (9) IV MWF; 104E    |
|    | (2) III MThF; 215E | (10) IV MWF; 135E   |
|    | (3) III MThF; 7E   | (11) III TThS; 135E |
|    | (4) I MWF; 107E    | (12) VII MWF; 107E  |
|    | (5) I MWF; 135E    | (13) VII MWF; 215E  |
|    | (6) VI MWF; 107E   | (14) VII MWF; 205E  |
|    | (7) VI MWF; 215E   | (15) VIII MWF; 107E |
|    | (8) IV MWF; 107E   | (16) VIII MWF; 215E |

7w—Explorations in Literature. Epics and modern plays. 3 cred.; prereq., 6; IV MWF; 22E. Mr. Richardson.

8s—Explorations in Literature. Novels. Some individual selection permitted. 3 cred.; prereq., 6; I MWF; 139EE. Mr. Richardson.

36s—The Technical Article. Practice in writing. Typical problems in presenting scientific and engineering information to various classes of readers. 3 cred.; prereq., 6; IV MWF; 206E. Mr. Haga.

37f,w,s—Technical Discussions. (M.E.) Oral presentation of technical and non-technical material for the purpose of developing speaking ability. Class criticism. Extemporaneous discussion. Limited to twenty-five students. 3 cred.; prereq., 6. Mr. Richardson.

37f II MWF; 135E

37w (1) II MWF; 135E

(2) III TThS; 135E

37s (1) III MWF; 135E

(2) I TThS; 135E

### FORESTRY

10w—Farm Woodlots and Windbreaks. Trees and their relation to the farm. Planning and planting farm windbreaks and shelter belts. Utilization and marketing of farm grove or woodlot products. 3 cred.; no prereq.; VI MWF; 201GH(UF). Mr. Cheyney.

### GENERAL ENGINEERING

11f—Orientation. A series of lectures designed to orient the student who has just begun his university course. No cred.; no prereq.; required of all freshmen in the College of Engineering and Architecture except architects; IX Th; 100C. Mr. Zelner.

12w—Orientation. A series of lectures covering the various branches of engineering given by the heads of departments, and other selected speakers. No cred.; no prereq.; required of all freshmen in the College of Engineering and Architecture except architects; IX Th; 100C. Mr. Zelner.

13s—Hygiene. Lectures on hygiene and first aid given by physicians and dentists on the university staff and others. No cred.; no prereq.; required of all male freshmen in the School of Chemistry and the College of Engineering and Architecture except architects; IX W; BuAud. Mr. Zelner.

70f,w,s—The Slide Rule. Computation practice and theory. Design of special scales. 1 cred.; prereq., M.&M. 12 or reg. in M.&M. 12. Mr. French.

70f I F; 104E

70w I W; 203E

70s I W; 205E

- 101f,w—Contracts and Specifications. Engineering contracts. Specification essentials; approved methods of handling construction projects; trade practices. Powers and duties of engineer executive. 3 cred.; jr. and sr. only; IV MWF; 238EE. Mr. Fixen.
- 112f-113w-114s—Rates for Public Utility Properties. Determination of the rate base and depreciation amount for transportation, gas, water, electric power, and telephone utilities operating expenses, the rate structure for particular utilities, service and discrimination. 3 cred. per qtr.; sr. and grad. in engineering, economics, and business administration. Mr. Bryant.
- 193s—Engineering Practice. Engineering relations, personal and ethical; business relations, letters and employment; legal relations and interpretation; patents, rights of invention; engineering specifications and salesmanship. Engineering reports and discussions. 2 cred.; sr. only. Mr. Martenis.
- (1) VI M, III Th; 254ME (2) III Th, I S; 254ME

## GENERAL SCIENCE

- 50w—Elementary Logic. 3 cred.; prereq., soph. standing; IV MWF; 6F. Mr. Castell.

## GEOLOGY AND MINERALOGY

- 1f,w,s,su-2f,w,s—General Geology (Dynamic and Historical). A synoptical treatment of the materials of the earth and of geologic processes, together with a study of the history of the earth and its inhabitants as recorded in the rocks. 3 cred. per qtr.; no prereq. Messrs. Thiel and Hanley.

1f	Lect. II TThS; 2P	Rec. II F; 2P
1w	Lect. IV MWF; 110P	Rec. IV T; 110P
1s	Lect. (1) III MWF; 110P (2) VII MWF; 110P	Rec. (1) III Th; 110P (2) VII T; 110P
2f	Lect. III MWF; 208P	Rec. III Th; 208P
2w	Lect. II TThS; 2P	Rec. II F; 2P
2s	Lect. IV MWF; 110P	Rec. IV T; 110P

- Af,w,s‡-Bf,w,s‡—General Geology Laboratory (General and Historical). 2 cred. per qtr.; no prereq.

Af	(1) I-II MW; 22P	(2) VI-VIII MW; 22P
Aw	VI-VII WF; 22P	
As	(1) III-IV TS; 22P	(2) VIII-IX MW; 22P
Bf	III-IV TS; 20P	
Bw	(1) I-II MW; 22P	(2) VI-VII MW; 22P
Bs	VI-VII WF; 22P	

- 1f,w,s,su-3w,s—General Geology (Dynamic and Economic). A synoptical treatment of the materials of the earth and the origin, distribution, and occurrence of metals, nonmetals, coal, and petroleum. 3 cred. per qtr.; no prereq. Mr. Emmons.

1f	Lect. III TThS; 110P	Rec. III F; 110P
1w	Lect. II MWF; 218P	Rec. II S; 218P
1s	Lect. (1) III MWF; 218P (2) VII MWF; 110P	Rec. (1) III Th; 218P (2) II T; 110P
3w	Lect. III TThS; 110P	Rec. III F; 110P
3s	Lect. II MWF; 110P	Rec. II S; 110P

‡ A fee of \$1 per quarter is charged for this course.

Af,w,s‡-Cw,s‡—General Geology Laboratory (General and Economic). 2 cred. per qtr.; no prereq.

Af	(1) III-IV MW; 22P	(2) VI-VII MW; 22 P
Aw	I-II TTh; 22P	
As	(1) III-IV TS; 22P	(2) VIII-IX MW; 22P
Cw	III-IV MW; 20P	
Cs	I-II TTh; 20P	

5f-6w—Engineering Geology. Materials of the earth and geologic processes. Applications of geology to engineering problems. Brief survey of occurrence, properties, production, and uses of building stones, cements, clays, fuels, and road material. Lectures and reference work. 3 cred. per qtr.; no prereq.; I MWF; 110P. Mr. Schwartz.

11f-12w-13s—General Geology (Dynamic and Historical). Materials of the earth and geological processes. Physiographic, dynamic, and structural geology. The sequence of events in geologic history. Must be completed for credit. For students in the School of Mines and Metallurgy. 2 cred. per qtr.; no prereq. Mr. Hanley.

11f	Lect. II MW; 110P
	Lab. II F; 110P
12w-13s	II MW; 210P

23f‡-24w‡—Elements of Mineralogy. The crystal systems; morphological, physical, and chemical characters of minerals; occurrence, genesis, and use of minerals; classification and description of common minerals, rock minerals, and common rocks. Determinative work in laboratory, blowpipe analysis, sight identification. 4 cred. per qtr.; prereq., Inorg. Chem. 10 or equiv. Mr. Gruner.

23f	Lect. I TThS; 210P	Rec. VIII Th; 210P
	Lab. (1) III-IV TS; 100P	(2) VI-VII TTh; 100P
24w	Lect. I TThS; 210P	Rec. VIII M; 210P
	Lab. (1) III-IV TS; 100P	(2) VI-VII MW; 100P

61f—Blowpipe Analysis. The determination of minerals by systematic blowpipe analysis. 3 cred.; prereq., 24; II TThS, IX Th, VII-VIII F. Mr. Gruner.

91f-92w-93s—Index Fossils of North America. A study of fossil forms with special reference to those of geologic importance; faunas and their correlation. 3 cred. per qtr.; prereq., 12 or 13. Mr. Stauffer.

91f	Lect. VI F; 210P
	Lab. VI-VII MW; 105P
92w-93s	Lect. I F; 210P
	Lab. VI-VII MW; 105P

100su—Field Work. About two weeks, approximately July 15 to 30, are spent in geologic mapping of selected areas in the iron district of Minnesota. Involves preparation of geologic maps and written reports. 3 cred.; prereq., 105. Messrs. Gruner and Thiel.

101f-102w—Sedimentation. Origin and structure of sedimentary deposits; the interpretation of these in relation to paleogeography. Lectures, assigned readings, and laboratory work. 3 cred. per qtr.; prereq., 24. Mr. Thiel.

101f	VIII MW, IX F; 210P
102w	VI T, VII-VIII TTh; 208P

‡ A fee of \$1 per quarter is charged for this course.

- 103w-104s—Micropaleontology. A study and classification of Foraminifera, diatoms, and other small fossil organisms, and their use for purposes of correlation. 3 cred. per qtr.; prereq., 51 or 91; II-III TThS; 103P. Mr. Stauffer.
- 105s—Rock Study. The occurrence and genesis of igneous, sedimentary, and metamorphic rocks; their mineral and chemical composition; their structure, texture, and alteration. The classification and methods of identification and description of rocks. 2 cred.; prereq., 1 or 7 or 13 and 24. Mr. Grout.
- Lect. I TS; 210P  
 Lab. (Sec. A) III-IV T; 200P (Sec. B) III-IV S; 200P
- 106f—Petrography. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. 2 cred.; prereq., 105. Mr. Grout.
- (1) VI-VII WF; 200P (2) VI-VII M, I-II Th; 200P
- 110f—Economic Geology. Study of nonmetallic minerals of economic value, and discussions of geologic guides to prospecting for these deposits. 3 cred.; prereq., 105; I TThS; 110P. Mr. Schwartz.
- 111w—Ore Deposits. The nature, distribution, and genesis of ore deposits of the United States; relations of ore deposits to geologic structure; the deformation and superficial alteration of ore deposits. 3 cred.; prereq., 105; I TThS; 110P. Mr. Emmons.
- 112s—Geology of Petroleum. The nature, origin, and accumulation of petroleum, discussion of the various oil fields of the world. 3 cred.; prereq., 105; I TThS; 110P. Mr. Emmons.
- 114s—Geology of Minnesota and Adjoining Areas. The geologic history, stratigraphy, and structure of Minnesota. 3 cred.; prereq., 105; IV MWF; 210P. Mr. Thiel.
- 118w—Principles of Geomorphology. Principles of physiography of the lands, or geomorphology. A study of the form and structure of plains, plateaus, volcanoes, and the different types of mountains. The normal or fluvial, glacial, marine, and arid cycles of erosion and the resulting land forms. Geology 145 is recommended as a desirable companion course. 3 cred.; prereq., 2 or 3 or 13; III MWF; 220P. Mr. Hanley.
- 119s—Geomorphology of the United States. A regional study of the United States by geomorphic or physiographic units. The development of the surface features as affected by rock structure and geologic history. Discussion of the principal problems presented by each area. 3 cred.; prereq., 2 or 3 or 13; II TThS; 220P. Mr. Hanley.
- 120s—Glacial Geology. Nature and process of glacial action. Land forms resulting from alpine and continental glaciers. Character and distribution of Pleistocene and earlier glacial deposits. 3 cred.; prereq., 2 or 3 or 13; I TThS; 220P. Mr. Hanley.
- 121f—Crystallography. Study of crystal models and space groups. Crystal drawings and measurements. Projections and mathematical calculations. 3 cred.; prereq., M.&M. 12 and Inorg. Chem. 10 or equiv. Mr. Gruner.
- 124w—Metamorphic Geology. The conditions, processes, and results of weathering and metamorphism. 3 cred.; prereq., 105; II MWF; 218P. Mr. Schwartz.
- 125s—Structural Geology. A study of the principles and applications of geologic structures. 3 cred.; prereq., 105; II MWF; 210P. Mr. Schwartz.

- 131w-132s—Advanced Petrology. Advanced optical methods. Criteria for rapid identification of minerals and rocks. The uses of schedules and tables. Standard rock types. Regional and genetic studies. Petrographic reports. 4 cred. per qtr.; prereq., 106. Mr. Grout.
- 131w Lect. III TThS; 210P  
 Rec. VI M; 210P  
 Lab. VI-VII ThF; 200P
- 132s Lect. III TThS; 210P  
 Rec. VI M; 210P  
 Lab. VI-VII ThF; 200P
- 140w-141s—Applied Petrography. Determination of ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations. Practical problems in mining and geology settled by microscopic and optical examinations. 3 cred. per qtr.; prereq., 131. Mr. Grout.
- Lect. II F; 200P  
 Lab. I-II MW; ar
- 144f—Interpretation of Geologic Maps. Study and problems in construction and interpretation of various types of geologic maps. Recognition of structural and stratigraphic relations. 4 cred.; prereq., 105; VI-IX WF; 220P. Mr. Hanley.
- 144Af—Interpretation of Geologic Maps. Same subject matter as 144f. For petroleum engineers. 3 cred.; prereq., 105; VI-IX WF; 220P. Mr. Hanley.
- 145w—Interpretation of Topographic Maps. Application of the principles of geomorphology to the interpretation of topographic maps. Practice in the recognition of land forms. Determination of underground structures and evolution of topography from surface contours. Geology 118 is a desirable companion course. 2 cred.; prereq., 2 or 3 or 13; VI-IX W; 220P. Mr. Hanley.
- 150su—Field Geology. Detailed, systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, reports; paragenesis of ores and their relation to geologic structures. Field, Black Hills, South Dakota. 6 cred.; prereq., 124. 4 weeks. First term, Summer Session. Approximately June 15 to July 15. Mr. Schwartz.
- 151f-152w-153s—Advanced General Geology. Geologic processes and their results; development of the North American continent. 3 cred. per qtr.; prereq., 2 or 3 or 13; III MWF; 210P. Mr. Stauffer.
- 161w—Crystal Structure. Study of point groups and space groups. Diffraction of X rays of crystals. Interpretation of powder and Laue diagrams. 3 cred.; prereq., 121, Phys. 7, 9 or 23, 43, M.&M. 13. Mr. Gruner.
- 165f—Ore Dressing Microscopy. Methods of studying opaque ore minerals and the application of metallurgical problems. 1 cred.; prereq., 106; VI-VIII Th. Mr. Schwartz.
- 166w-167s—Mineralography. Methods of studying opaque minerals and the application of the methods to problems in ore genesis and history. 3 cred. per qtr.; prereq., 111 or reg. in 111, 131. Mr. Schwartz.
- 166w VI-VII TThF; 207P  
 167s VI-VIII TF; 207P
- 170f,w,s—Geologic Problems. Special problems adapted to the needs of the student. 3 cred.; ar.



GERMAN

24f-25w-26s—Chemical German. Pronunciation, reading, sentence analysis, and translation. 3 cred. per qtr.; for students who have had no German previously.

(1) IV MWF; 113F

(2) V MWF; 209½F

27f-28w-29s—Chemical German. Representative chemical prose. 3 cred. per qtr.; prereq., two years high school German or one year college German; IV MWF; 209F.

41f-42w-43s—Chemical German. Readings from German chemical periodicals. 2 cred. per qtr.; prereq., German 26 or the equivalent; IV TS; ar.

HISTORY

84a—The History of Engineering and Industrial Technology. 3 cred.; jr., sr.; no prereq.; ar. Mr. Heaton.

HORTICULTURE

6f—Fruit Growing. Fundamental principles of fruit growing. Sites, soils, nursery stock, planting and planting plans, tillage, fertilization, cover crops, pollination, frost avoidance, pruning and thinning. Lectures, references. 3 cred.; no prereq.; II MWF; 102Hr(UF). Mr. Brierley.

MATHEMATICS AND MECHANICS

The Mathematics and Mechanics Department maintains a consultation period for freshman and sophomore mathematics students VI-IX MTWThF, 206E, beginning the third week of the quarter.

MATHEMATICS

3w-4s—Freshman Mathematics for Architects. A short course in algebra, trigonometry, and analytical geometry. Open to architects only. 5 cred. per qtr.; prereq., for 3, M.&M. 9 or equiv., for 4, 3; IV MTWFS; 3E.

9f—Higher Algebra. (High School.) Fundamental rules, fractions, linear simultaneous equations, graphs, theory of exponents, surds, complex quantities, quadratic equations, numerical exercises. No cred.; no prereq.

(1) VII MWF, VIII T, 106E; II S, 104E (2) V MWThF, IX T; 205E

11f,w,su—College Algebra. Review of fundamental operations, factoring, fractions, linear simultaneous equations, exponents, surds, complex numbers, and quadratic equations. Theory of quadratic equations, ratio, proportion, variation, determinants, binomial theorem, progressions, theory of equations, higher numerical equations, partial fractions, and infinite series. 5 cred.; prereq., M.&M. 9 or equiv.

11f (1) II MWThFS; 3E  
 (2) II MWThFS; 4E  
 (3) II MTWThFS; 5E  
 (4) I MTWThS; 4E  
 (5) I MTWThS; 104E  
 (6) I MTWThS; 227E  
 (7) I MWThFS; 111M  
 (8) VII MTWThF; 136E  
 (9) VII MTWThF; 203E

(10) VII MTWThF; 205E  
 (11) VIII MTWF, III S; 136E  
 (12) VIII MTWF, III S; 21E  
 (13) VI MTWThF; 3E  
 (14) VI MTWThF; 4E  
 (15) VI MTWThF; 106E  
 (16) VI MTWThF; 203E  
 (17) VI MTWThF; 5E

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|-----|--------------------|---------------------------|
| 11w | (1) II MWThFS; 3E  | (4) VIII MWThF, III S; 3E |
|     | (2) II MWThFS; 22E | (5) V MTWThF; 3E          |
|     | (3) I MTWThS; 111M | (6) V MTWThF; 4E          |

12w,s,su—Trigonometry. Graphical representation of functions, computation by logarithms and slide rule. Trigonometric functions, plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, De Moivre's theorem, spherical right triangles. 5 cred.; prereq., 11.

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|-----|---------------------|-----------------------------|
| 12w | (1) II MWThFS; 4E   | (8) VII MTWThF; 205E        |
|     | (2) II MWThFS; 7E   | (9) VIII MWThF, III S; 203E |
|     | (3) II MWThFS; 107E | (10) VIII MWThF, III S; 4E  |
|     | (4) I MTWThS; 4E    | (11) VI MTWThF; 3E          |
|     | (5) I MTWThS; 136E  | (12) VI MTWThF; 4E          |
|     | (6) I MTWThS; 206E  | (13) VI MTWThF; 21E         |
|     | (7) VII MTWThF; 3E  | (14) VI MTWThF; 136E        |
| 12s | (1) I MTWThF; 4E    | (5) VIII MTWThF; 4E         |
|     | (2) I MTWThF; 206E  | (6) V MTWThF; 4E            |
|     | (3) II MWThFS; 4E   | (7) V MTWThF; 205E          |
|     | (4) III MWThFS; 3E  |                             |

13f,s,su—Analytical Geometry. Rectangular co-ordinate systems, locus and equation, straight line, circle, parabola, ellipse, hyperbola. Transformation of co-ordinates and simplification of equations. Polar co-ordinates, higher plane curves, tangents, normals. Empirical equations, solid analytic geometry. 5 cred.; prereq., 11 and 12.

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|-----|----------------------|------------------------|
| 13f | (1) V MTWThF; 136E   | (4) I MTWThF; 203E     |
|     | (2) V MTWThF; 203E   | (5) VIII MTWThF; 104E  |
|     | (3) V MTWThF; 215E   | (6) III MTWThF; 136E   |
| 13s | (1) I MTWThF; 3E     | (9) VII MTWThF; 3E     |
|     | (2) I MTWThF; 203E   | (10) III MWThFS; 206E  |
|     | (3) I MTWThF; 111M   | (11) III MWThFS; 5E    |
|     | (4) II MWThFS; 3E    | (12) VIII MTWThF; 227E |
|     | (5) II MWThFS; 104E  | (13) VI MTWThF; 3E     |
|     | (6) II MWThFS; 7E    | (14) VI MTWThF; 4E     |
|     | (7) VII MTWThF; 227E | (15) VI MTWThF; 203E   |
|     | (8) VII MTWThF; 136E |                        |

24f,w,su—Calculus I: Differential. Limit, derivative, simple application of derivative, maxima and minima, differentials, rates, radius of curvature, indeterminate forms, partial differentiation, the differential as an approximation, series, expansion of functions. 5 cred.; prereq. 13.

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|-----|---------------------|-----------------------|
| 24f | (1) V MTWThF; 4E    | (8) VIII MTWThF; 215E |
|     | (2) V MTWThF; 3E    | (9) I MTWThF; 22E     |
|     | (3) V MTWThF; 104E  | (10) I MTWThF; 3E     |
|     | (4) IV MTWFS; 106E  | (11) I MTWThF; 106E   |
|     | (5) IV MTWFS; 21E   | (12) VII MTWThF; 104E |
|     | (6) II TWThFS; 106E | (13) III MWThFS; 22E  |
|     | (7) II TWThFS; 206E | (14) III MWThFS; 104E |
| 24w | (1) V MTWThF; 203E  | (4) VII MTWThF; 136E  |
|     | (2) V MTWThF; 205E  | (5) III MTWThF; 104E  |
|     | (3) V MTWThF; 136E  | (6) III MTWThF; 22E   |

25w,s,su—Calculus II: Integral. Integration of standard elementary forms, rational fractions, by substitution, by parts; trigonometric integrals, definite integral, integration as a process of summation; geometric applications, liquid pressure, work, centroids, moments of inertia, double and triple integrals. 5 cred.; prereq., 24.

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|-----|----------------------|-------------------------|
| 25w | (1) V MTWThF; 215E   | (7) IV MTWF, II S; 106E |
|     | (2) V MTWThF; 227E   | (8) VII MTWThF; 106E    |
|     | (3) V MTWThF; 106E   | (9) VI MTWF, IV S; 106E |
|     | (4) III MTWThF; 106E | (10) I MTWThF; 205E     |
|     | (5) III MTWThF; 215E | (11) I MTWThF; 227E     |
|     | (6) III MTWThF; 4E   | (12) I MTWThF; 22E      |
| 25s | (1) VII MTWThF; 106E | (4) V MTWThF; 215E      |
|     | (2) II MTWThF; 203E  | (5) III MTWThF; 104E    |
|     | (3) II MTWThF; 206E  | (6) III MTWThF; 106E    |

31f-32w-33s—Differential and Integral Calculus. Three-quarter course in calculus for students in the School of Mines and Metallurgy. 9 cred.; prereq., 13.

31f II TS, III Th; 111M

32w-33s IV MWF; 111M

91f\*—Calculus (Arch., Prebus.). Short course, derivatives, maxima and minima, integration of simple forms, definite integrals, areas. 4 cred.; prereq., 13; I MWFS; 206E.

124f-125w-126s—Advanced Calculus with Applications. 3 cred. per qtr.; prereq., 25; II MWF; 36EE.

151f,w—Differential Equations. Differential equations and their solutions. First order and first degree, first order and higher degree, singular solutions; total differential equations, linear differential equations, miscellaneous methods system of simultaneous equations, integration in series. 3 cred.; prereq., 25; I MWF; 335EE(f), 3E(w).

152w—Calculus III: Special Topics in Advanced Calculus. 3 cred.; prereq., 151; I MWF; 215E.

153s—Calculus IV: Special Topics in Advanced Calculus. 3 cred.; prereq., 152; I MWF; 215E.

154f—Vector Analysis. 3 cred.; prereq., 26; IV MWF; 139EE.

155w—Vector Analysis and Dyadics with Applications. 3 cred.; prereq., 154; IV MWF; 139EE.

156s—Elements of Tensor Analysis. 3 cred.; prereq., 154; IV MWF; 138EE.

164f-165w-166s—Operational Methods and the Operational Calculus. 3 cred. per qtr.; prereq., 151 or by permission; ar.

167f-168w-169s—Mathematics of Modern Engineering. 3 cred. per qtr.; prereq., 26; IV MWF; 7E.

254—Dynamics Applied to Flight. 3 cred.; prereq., 127 and 153 or 167 or permission of instructor.

261f-262w-263s—Functions of a Complex Variable. Elliptic functions and integrals with applications. 3 cred. per qtr.; prereq., 153. (Not offered in 1941-42).

For other courses see Combined Class Schedule Bulletin.

MECHANICS

26f,w,s,su—Technical Mechanics: Statics. Concurrent force systems, parallel forces, couples, center of gravity, statics of rigid bodies, graphical methods, friction, work, theory of moment of inertia. 5 cred.; prereq., 25.

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|-----|----------------------|-----------------------|
| 26f | (1) II MTWThF; 136E  | (4) V MTWThF; 21E     |
|     | (2) II MTWThF; 205E  | (5) IV MTWFS; 136E    |
|     | (3) V MTWThF; 106E   |                       |
| 26w | V MTWThF; 104E       |                       |
| 26s | (1) VII MTWThF; 104E | (5) IV MTWFS; 106E    |
|     | (2) VII MTWThF; 203E | (6) IV MTWFS; 4E      |
|     | (3) II MTWThF; 106E  | (7) III MTWThF; 136E  |
|     | (4) II MTWThF; 215E  | (8) III MTWThF; 215Ex |

\* For permissible substitute, see page 87.

84s\*—Technical Mechanics. (Chem., Chem.E., and Prebus.) Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia, stresses in framed structures and machines, kinematics, dynamics of a particle. Newton's laws of motion, work, energy, power, impulse, and momentum. 5 cred.; prereq., 25 or 91.

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|----------------------|--------------------|
| (1) III MWThFS; 203E | (3) I MTThFS; 22E  |
| (2) III MWThFS; 4E   | (4) I MTThFS; 205E |

92w\*—Mechanics for Architects. Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia of plane sections, stresses in framed structures. 4 cred.; prereq., 91; I MWFS; 7E.

127f,w,s—Technical Mechanics: Dynamics. Kinematics of the particle and rigid body, theorem of Coriolis, particle dynamics, dynamics of a rigid body in plane motion, the energy equation, impulse and momentum, applications to technical problems. 5 cred.; prereq., 26.

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| 127f (1) III MWThFS; 203E | (4) IV MTWFS; 3E     |
| (2) I MTWFS; 205E         | (5) IV MTWFS; 227E   |
| (3) II MTWThS; 203E       |                      |
| 127w (1) II MTWThF; 203E  | (3) III TWThFS; 205E |
| (2) II MTWThF; 106E       | (4) IV MTWFS; 203E   |
| 127s (1) IV MTWFS; 136E   | (4) II MTWFS; 205E   |
| (2) IV MTWFS; 21E         | (5) VI MTWThF; 205E  |
| (3) I MWThFS; 106E        |                      |

161f-162w-163s—Advanced Technical Mechanics. Moving axes, Eulerian angles, Lagrange's equations, generalized co-ordinates, dynamical problems soluble in terms of circular and elliptic functions, dynamical specifications of bodies, motion of a top, theory of vibrations, Hamilton's principle. Special problems. 3 cred. per qtr.; prereq., 127; ar.

274f-275w-276s—Advanced Dynamics of a Particle. 3 cred. per qtr.; prereq., 127.

277f-278w-279s—Advanced Statics. Text, Routh's *Analytical Statics*. 3 cred. per qtr.; prereq., 127. (Not offered in 1941-42.)

297w-298s—Vibration Problems. 3 cred. per qtr.; prereq., 127.

#### MATERIALS

85f,s\*—Strength of Materials. (Chem.E. and Prebus.) Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, dynamic stresses. 3 cred.; prereq., 84.

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|---------------------|-----------------------------|
| 85f (1) VI MWF; 7E  | (3) IV T, V Th, III S; 107E |
| (2) I TS, II Th; 7E |                             |
| 85s VI MWF; 106E    |                             |

87f,s—Materials Testing Laboratory. (Chem.E. and Prebus.) Investigation of the physical properties of various metals and engineering materials (steel, cast iron, wood, brick, etc.). Standard methods of testing. 1 cred.; prereq., 85 or reg. in 85.

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|-----------------------|-------------------|
| 87f (1) VIII-IX M; Ex | (4) VI-VII F; Ex  |
| (2) VIII-IX W; Ex     | (5) VI-VII T; Ex  |
| (3) III-IV W; Ex      |                   |
| 87s (1) VIII-IX M; Ex | (2) VIII-IX W; Ex |

93s\*—Strength of Materials. (Arch.) Mechanical and elastic properties of materials of construction, design of riveted joints, beam theory, columns, arches. 4 cred.; prereq., 91 and 92; I MWFS; 5E.

\* For permissible substitute, see page 87.

128f,w,s—Strength of Materials. Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, hollow cylinder rollers, plates, curved bars, springs, dynamic stresses, true stresses. 5 cred.; prereq., 26.

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|------|----------------------|----------------------|
| 128f | (1) III MWThFS; 205E | (3) IV MTWFS; 203E   |
|      | (2) II MTWThF; 104E  |                      |
| 128w | (1) IV MTWFS; 4E     | (6) III MWThFS; 5E   |
|      | (2) IV MTWFS; 205E   | (7) VI MTWThF; 205E  |
|      | (3) II MTWThF; 136E  | (8) I TWThFS; 106E   |
|      | (4) II MTWThF; 5E    | (9) IV MTWFS; 315M   |
|      | (5) III MWThFS; 136E |                      |
| 128s | (1) II MTWFS; 110Ex  | (3) III MWThFS; 205E |
|      | (2) IV MTWFS; 205E   |                      |

141f,w,s—Materials Testing Laboratory. Investigation of the physical properties of various metals and engineering materials (steel, cast iron, wood, cement, brick, etc.). Standard methods of testing. 2 cred.; prereq., 128 or reg. in 128.

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|------|-------------------------|--------------------|
| 141f | Lect. (1) VI T; 110Ex   | (2) III M; 110Ex   |
|      | Lab. (1) VIII-IX T; Ex  | (4) II-III Th; Ex  |
|      | (2) VI-VII Th; Ex       | (5) I-II S; Ex     |
|      | (3) VI-VII W; Ex        | (6) VIII-IX Th; Ex |
| 141w | Lect. (1) VII Th; 110Ex | (3) VII W; 110Ex   |
|      | (2) VI W; 110Ex         |                    |
|      | Lab. (1) I-II W; Ex     | (7) VI-VII F; Ex   |
|      | (2) VIII-IX M; Ex       | (8) II-III M; Ex   |
|      | (3) I-II S; Ex          | (9) VIII-IX Th; Ex |
|      | (4) VIII-IX W; Ex       | (10) VIII-IX T; Ex |
|      | (5) II-III Th; Ex       | (11) VI-VII T; Ex  |
|      | (6) VIII-IX F; Ex       | (12) III-IV W; Ex  |
| 141s | Lect. (1) VI T; 110Ex   | (2) VI F; 110Ex    |
|      | Lab. (1) VIII-IX T; Ex  | (4) VI-VII W; Ex   |
|      | (2) VI-VII M; Ex        | (5) I-II S; Ex     |
|      | (3) VIII-IX F; Ex       |                    |

144s—Materials Testing Laboratory. (Mines.) 2 cred.; prereq., 128; VI-IX Th; Ex.

180w—Advanced Strength of Materials. Stress analysis in statically indeterminate structures. Theory of superposition. Energy of strain. Elastic stability. 3 cred.; prereq., M.&M. 128; II MWF; 206E.

181f-182w-183s—Applied Elasticity. Special problems in stress analysis. 3 cred. per qtr.; prereq., M.&M. 128; IV MWF; 5E.

184f-185w-186s—Advanced Testing Materials Laboratory. Special problems relating to the physical properties of engineering materials. 2 cred. per qtr.; prereq., 141.

294f-295w-296s—Mathematical Theory of Elasticity. 3 cred. per qtr.; prereq., 128, 153.

HYDRAULICS

86f\*—Hydraulics with Laboratory. (Chem.E.) Hydrostatics, Bernoulli's theorem. flow through orifices, pipes, and over weirs, dynamic action of jets and streams, flow of gases through pipes. 3 cred.; prereq., 84.

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|---|-----------------------------------|
| (1) VI M, 215E; VI W, 227E; VI-VII F, 201Ex | (3) III T, II F, 21E; VIII-IX Th, |
| (2) II MTh, 22E; VIII-IX M, 201Ex           | 201Ex                             |

\* For permissible substitute, see page 87.

129f,w,s—Hydraulics. Laws of equilibrium of fluids, flow through orifices and over weirs, pressure and flow through tubes and pipes, flow in conduits and rivers, dynamic pressure of water, elementary principles of turbines and pumps. 4 cred.; prereq., 26.

129f	Lect. (all sections) I Th; HL	
	Rec. (1) VI TWF; 215E	(4) IV TS, VI Th; 215E
	(2) IV MWF; 215E	(5) II TWS; 110Ex
	(3) III MWF; 7E	(6) III TThS; 227E
129w	Lect. (all sections) I Th; HL	
	Rec. (1) I MTF; 21E	(3) IV MWF; 136E
	(2) I MTF; 203E	(4) IV MWF; 227E
129s	Lect. (all sections) I Th; HL	
	Rec. (1) I MWF; 136E	(3) II TThS; 136E
	(2) II MWF; 136E	

130f—Open Channel Flow. Theory of uniform and varied flow in open channels, with practical applications to the design of hydraulic structures, computations for drawdown curves, backwater curves, hydraulic jump, measuring flumes, submerged weirs, etc. 3 cred.; prereq., 129 and 143; ar.

132f-133w-134s—Advanced Hydraulic Problems. Special problems in hydraulic design. 2 cred. per qtr.; prereq., 130 or reg. in 130.

143f,w,s—Hydraulics Laboratory. Experimental and demonstrational work. Pressure head, Piezometer tubes, gages, stability of flotation, Bernoulli's theorem. Venturi meter, flow through orifices, over weirs, and through pipes. Open channels, gaging, impact on vanes, pumps, and hydraulic machines. 1 cred.; prereq., 86 or 129 or reg. in 86 or 129.

143f	(1) II-III M; Ex	(6) II-III Th; Ex
	(2) VIII-IX M; Ex	(7) VIII-IX W; Ex
	(3) III-IV W; Ex	(8) VI-VII Th; Ex
	(4) VI-VII W; Ex	(9) VIII-IX F; Ex
	(5) III-IV F; Ex	(10) VI-VII T; Ex
143w	(1) VI-VII M; Ex	(3) VIII-IX Th; Ex
	(2) VIII-IX T; Ex	(4) VIII-IX F; Ex
143s	(1) VI-VII M; Ex	(5) III-IV F; Ex
	(2) VIII-IX F; Ex	(6) III-IV S; Ex
	(3) VIII-IX M; Ex	(7) VIII-IX Th; Ex
	(4) VIII-IX W; Ex	(8) VI-VII W; Ex

190w—Mechanics of Similitude and Dimensional Analysis. Theory of the use of models in design; conditions for similarity in the case of hydraulic structures, elastic structures, aircraft, ships, waves, etc. 3 cred.; prereq., 127, 128, and 129; ar.

191w—Hydraulic Motors and Pumps. Study of the hydraulic theory of the ram, impulse wheel, reaction turbine, and centrifugal pump. 3 cred.; prereq., 129; ar.

192s—Natural and Artificial Waterways. Wave motion, tides, ship resistance, transportation of sediment. Control and regulation of rivers, design of ship canals, locks, dry docks, movable dams, harbors. 3 cred.; prereq., 130 or permission; ar.

193w—Hydraulic Measurements. Detailed study of the current meter. Venturi meter, weir, orifice. Parshall flume, traveling screen, chemical method of gaging, etc. 3 cred.; prereq., 129; I MWF; 104E.

- 194f-195w-196s—Advanced Hydraulics Laboratory. Special experimental studies concerning the characteristics of turbines, pumps, etc. Hydraulic models. 2 cred. per qtr.; prereq., 129 and 143; ar.
- 197f-198w-199s—Mechanics of Soils. 2 cred. per qtr.; prereq., 129, 143; ar.
- 232f-233w-234s—Advanced Fluid Mechanics. 3 cred. per qtr.; prereq., 190.
- 281f-282w-283s—Hydrodynamics. 3 cred. per qtr.; prereq., 129, 153.
- 284f-285w-286s—Advanced Hydrodynamics. 3 cred. per qtr.; prereq., 283.

## MECHANICAL ENGINEERING

## MANUFACTURING PROCESSES LABORATORIES

- 1f,su‡—Elementary Woodworking. (Ind.Ed.) Fundamental operations in bench practice layout and assembly of unit parts. Manipulation and care of hand tools. Elementary wood turning, demonstration and practice. Not an engineering elective. 2 cred.; no prereq.; VI-VIII MW. Mr. Richards.
- 2w,su‡—Machine Woodworking. (Ind.Ed.) Operation and setting up of wood-working machinery. Care and maintenance of cutting tools and power equipment. Advanced wood turning, demonstrations and practice. Not an engineering elective. 2 cred.; no prereq.; VI-VIII MW. Mr. Richards.
- 3w,s,su‡—Wood Finishing and Furniture Construction. (Int.Arch. and Ind.Ed.) Identification and use of woods and finishing materials, wood finishing methods, color blending of stains and fillers, use of undercoats, lacquers, paints, etc.; and their application to wood surfaces. Furniture construction and design of period, modern, and upholstered furniture. Preparation and assembly of woods, textiles, upholstering, and finishing materials. Inspection trips. Not an engineering elective. 2 cred.; no prereq.

3w II-III MWF  
3s VI-VIII MW

- 4s,su‡—General Woodwork. (Prebus.) Study of the principles involved in the construction of articles made of wood and wood products. Uses and compositions of paints, varnishes, stains, and wood preservatives. 2 cred.; no prereq. Mr. Richards.

Lect. V TTh; 202ME  
Lab. I-III T

- 5f,w,s,su‡—Pattern Practice. Study of the principles and uses of metal and wooden patterns, core boxes, and sweeps for the production of metal castings. Industrial practices and conventions. Inspection trips. 2 cred.; prereq., Chem. 5 or 15, and Dr. 2. Mr. Richards.

5f	Lect. (1) I TTh; 202ME (2) IX WTh; 202ME	(3) VI T, III F; 202ME
	Lab. (1) VI-VIII Th (2) I-III S (3) VII-IX T	(4) VII-IX F (5) II-IV M
5w	Lect. (1) II TS; 202ME (2) I MF; 202ME	(3) IX W, IV S; 202ME
	Lab. (1) I-III Th (2) VII-IX T (3) VI-VIII Th	(4) VII-IX F (5) I-III T
5s	Lect. IV M, I S; 202ME Lab. VII-IX T	

‡ A fee of \$2 per quarter is charged for this course.

6f,w,s,su‡—Advanced General Woodwork. Study of the factors in mass production of furniture, mill work, and interior finishings. Adaptation of plywoods and plastics. Use of machines in producing general wood products. 2 cred.; prereq., 5; ar. Messrs. Koepke and Richards.

7s‡—Nonmetal Manufacturing. Methods and processes of manufacturing goods from materials such as wood, glass, plastics, asbestos, bakelite, hard rubber, and other synthetic substances. 3 cred.; prereq., 18, 20. Messrs. Koepke and Richards.

8w,su‡—Foundry Practice. (Ind.Ed.) Theory and practice in melting iron, brass, bronze, and aluminum. Practice in making cores and molds for ornamental and commercial castings. Not an engineering elective. 2 cred.; no prereq.; VI-VIII MW. Messrs. Holtby and Scobie.

9f,w,s,su‡—Foundry Practice. Theory and practice in melting, alloying, and casting ferrous and nonferrous metals. Theory of foundry control methods, risers, feeders, gates, and pattern design. Practice in making cores and molds in relation to part design. Problems and reports. 2 cred.; prereq., Chem. 4 or 14. Messrs. Holtby and Scobie.

9f	Lect. (1) VI F, I S; 153ME	(3) I TTh; 153ME
	(2) VI T, VII W; 153ME	
	Lab. (1) II-IV S	(4) VI-VIII Th
	(2) VII-IX T	(5) VI-VIII W (Met.E. only)
	(3) II-IV W	(6) VI-VIII M (Min. and Pet.E. only)
9w	Lect. (1) VII M; I S; 153ME	(2) VI T, I F; 153ME
	Lab. (1) VII-IX F	(3) I-III T
	(2) VII-IX T	(4) I-III W
9s	Lect. VII T, IX Th; 153ME	
	Lab. (1) VI-VIII M	(2) II-IV S

10w,su‡—Advanced Foundry Practice. Foundry control methods. Laboratory practice in sand testing. Steel, malleable iron, and nonferrous castings. 2 cred.; prereq., 9; ar. Mr. Scobie.

11f,w,s,su‡—Metal Working. (Prebus.) Theory and practice in the working and joining of metals including soldering, brazing, and welding. 2 cred.; no prereq. Mr. T. P. Hughes.

11f	Lect. IV M, IX W; 153ME
11w,s	Ar.
	Lab. III-V W

12f,su‡—General Metal Work. (Ind. Ed.) Working various metals. This course is designed to meet the needs of teachers of elementary forging and art metal courses. Projects designed for individual needs. Not an engineering elective. 2 cred.; no prereq.; VI-VIII MW. Mr. T. P. Hughes.

13f,w,s,su‡—Forging and Welding. Theory of production and working of metals; operation of furnaces; thermit, electric arc, oxyacetylene, and spot welding. 2 cred.; prereq., Chem. 5 or 15, and Dr. 2. Mr. T. P. Hughes.

13f	Lect. (1) VIII MW; 153ME	(2) V TTh; 153ME
	Lab. (1) VI-VIII F	(3) II-IV S
	(2) VI-VIII T	(4) II-IV F
13w	Lect. (1) II TTh; 153ME	(3) VI W, II S; 153ME
	(2) III TTh; 153ME	(4) VI M, V Th; 153ME
	Lab. (1) I-III M	(5) VI-VIII F
	(2) I-III F	(6) VII-IX Th (Met.E. only)
	(3) VII-IX T	(7) VII-IX M (Min. and Pet.E. only)
	(4) VII-IX W	

‡ A fee of \$2 per quarter is charged for this course.



- 13s Lect. (1) IX M, VIII F; 153ME (2) VI Th, VII F; 153ME  
 Lab. (1) I-III W (4) VI-VIII T  
 (2) VI-VIII M (5) VI-VIII W  
 (3) II-IV S
- 14f,w,s,su‡—Advanced Welding. Engineering approach to the technique and application of electric arc, oxyacetylene, and resistance welding. Theory and practice. Problems. 2 cred.; prereq., 13; ar. Mr. T. P. Hughes.
- 15f,w,s—Survey of Manufacturing Processes. (Chem. and Chem. E.) Technique of machine shop, forge, and foundry practices. Lectures and demonstrations. 3 cred.; no prereq. Messrs. T. P. Hughes, Crowder, and Holtby.
- 15f I MWF; 153ME  
 15w,s IV MWF; 153ME
- 16s,su‡—Machine Shop Practice. (Mines, Met., Pet. E.) Fundamental operation on lathes, shaper drill press, milling machine, and grinder. Bench work. Job analysis based on unit operations. 2 cred.; prereq., 13. Mr. Crowder.
- Lect. VI M, II Th; 202ME  
 Lab. (1) VII-IX M (2) I-III F
- 17f,s,su‡—Machine Shop Practice. (E.E., Prebus.) Fundamental operation on lathes, drill press, milling machine, and grinder. Turret lathe operation and gear cutter. 2 cred.; prereq., 13. Mr. Crowder.
- 17f Lect. VI M, II Th; 202ME  
 Lab. II-IV S
- 17s Lect. (1) IV T, VI F; 202ME (3) III MW; 202ME  
 (2) II MW; 202ME
- Lab. (1) VII-IX F (3) VII-IX W  
 (2) II-IV S
- 18f,w‡—Machine Shop Practice. (Aero.E.) Fundamental operations on lathes, shaper, drill press, milling machine, boring machine, and grinder, turret lathe operation, polishing and buffing, gear cutting and tool grinding, production methods, routing, and machine selection. 2 cred.; prereq., 5, 13. Mr. Crowder.
- 18f Lect. (1) VII M, I S; 202ME (2) IX M, VIII F; 202ME  
 Lab. (1) II-IV M (3) II-IV W  
 (2) I-III T
- 18w Lect. VIII M, I W; 202ME  
 Lab. (1) I-III F (2) I-III Th
- 19s,su‡—Machine Shop Practice. (Ind.Ed.) Fundamental operations on lathes, shapers, drill presses, milling machines, and grinders. Bench work and measurements. Job analysis based on unit operations. Not an engineering elective. 2 cred.; no prereq.; VI-VIII TTh. Mr. Crowder.
- 71f,su‡—Machine Shop Practice. (M.E.) Care and operation of machine tools, for the manufacture of an electric motor. Writing of manufacturing operation sheets for quantity production of machine parts. Inspection trips. 2 cred.; prereq., 5, 9, 13. Mr. Crowder.
- Lect. (1) VI WF; 202ME (3) VIII M, VI Th; 202ME  
 (2) IV T, VII F; 202ME
- Lab. (1) VII-IX W (4) II-IV F  
 (2) VII-IX T (5) VII-IX Th  
 (3) I-III Th

‡ A fee of \$2 per quarter is charged for this course.

72w,su‡—Machine Shop Practice. (M.E.) Care and operation of turret lathes, shapers, milling, and grinding machines. Machinability determinations. Operation sheets for the production of complete units. Inspection trips. 2 cred.; prereq., 71. Mr. Crowder.

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|-------|-----------------------|------------------------|
| Lect. | (1) VI TTh; 202ME     | (3) VI F, III S; 202ME |
|       | (2) VII M, VTh; 202ME |                        |
| Lab.  | (1) VII-IX T          | (4) VII-IX Th          |
|       | (2) VII-IX F          | (5) I-III M            |
|       | (3) VII-IX W          |                        |

73w,s‡—Advanced Machine Shop Practice. Setting up of turret lathes, milling and grinding machines for quantity production. Machinability determinations. Writing of manufacturing operation sheets for complete units. The application of jigs, fixtures, punch press dies, for metal products, and molds for plastic materials. Inspection trips. 3 cred.; prereq., 16, 17, 18, or 72. Mr. Crowder.

110f,w,s,su‡—Foundry Control Methods. X-ray analysis of castings. Laboratory practice in metals analysis, ferrous and nonferrous melting operations and control. Problems and reports. 3 cred.; prereq., 9, Chem. 16; ar. Messrs. Holtby and Scobie.

111f,w,s,su‡—Advanced Foundry Practice. Continuation of Course 110. 3 cred.; prereq., 110, Phys. 9, Chem. 16; ar. Messrs. Holtby and Scobie.

#### MACHINE DESIGN

20f,w—Elementary Machine Design. Technique and knowledge necessary to convey information from engineering department to shop. Drawing room and shop standards; fits, limits, and tolerances; heat treating, welding, and material specifications; records and changes. 2 cred.; prereq., Draw. 3. Mr. Palmer.

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|-----|------------------------|-----------------------|
| 20f | (1) VI-VII MTW; 151ME  | (3) III-IV MFS; 151ME |
|     | (2) VIII-IX MWF; 151ME | (4) I-II WFS; 151ME   |
| 20w | I-II TWTh; 151ME       |                       |

21w,s—Kinematics. Instant centers, centroids, point paths, gear tooth profiles, cam construction, velocity diagrams. Lectures and drafting. 2 cred.; prereq., 20. Messrs. Palmer and Laitala.

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|-----|-------------------------------|---------------------------------|
| 21w | V-VI MThF; 151ME              |                                 |
| 21s | (1) I-II MThF; 151ME          | (4) VIII-IX MW, III-IV S; 151ME |
|     | (2) I-II TS, VI-VII Th; 151ME | (5) VIII-IX TThF; 151ME         |
|     | (3) VI-VII MWF; 151ME         |                                 |

22f—Mechanism. Motion studies. Revolving and oscillating bodies, linkages, chains, flexible connectors, gearing, wheels in trains, epicyclic gear trains, worm and wheel, screws, straight line motions, hoists, pulley blocks, ratchets, intermittent motions. Recitations and problems. 3 cred.; prereq., 21 and M.&M. 24. Mr. Palmer.

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|-----|----------------|-----|-----------------|
| (1) | II TThS; 252ME | (4) | IV MWF; 252ME   |
| (2) | I TThS; 252ME  | (5) | III TThS; 252ME |
| (3) | III MWF; 252ME |     |                 |

‡ A fee of \$2 per quarter is charged for this course.

- 23w—Dynamics of Machine Design. Valve mechanism; governors; static, dynamic, and reciprocating balance; crank effect diagrams; gyroscopic action; critical speeds. 3 cred.; prereq., M.&M. 127. Messrs. Ryan and Palmer.
- Lect. (1) III T; 254ME (3) III W; 254ME  
(2) IV T; 254ME
- Lab. (1) I-III MTh; 10P (3) I-III T, VII-IX F; 10P  
(2) VII-IX T, II-IV S; 151ME (4) VII-IX W, II-IV F; 151ME
- 24s—Elements of Machine Design. Design of beams, shafting, columns, screw fastenings, springs, friction clutches, and brakes. Factor of safety. Stresses due to sudden applied, repeated, and reversed loads. 3 cred.; prereq., M.&M. 128. Mr. Ryan.
- Rec. (1) II WF; 252ME (3) III TW; 252ME  
(2) VI MF; 252ME (4) I TS; 252ME
- Lab. (1) I-III T; 10P (3) VII-IX F; 10P  
(2) II-IV S; 10P (4) VI-VIII T; 10P
- 26w,s—Mechanism and Kinematics (E.E., Aero.E., and Ag.E.) Kinematics of machines. Levers, linkwork, flexible connections, gearing, screws, cams, epicyclic trains. Graphical studies of velocities. Motion; intermittent, parallel, quick return, and escapements. 3 cred.; prereq., M.&M. 24. Mr. Palmer.
- 26w (1) III WThS; 252ME (4) I MWF; 252ME  
(2) IV MWF; 252ME (5) I TThS; 252ME  
(3) IV TS, VI Th; 252ME (6) II TThS; 252ME
- 26s IV MWF; 252ME
- 27s—Machine Design. (Aero.E. and Ag.E.) Fundamental principles of design of machine elements; lubrication, theory and application; friction drives, shafts, screws, gears, belt connectors, springs, flywheels, machine frames, shrink fits. 3 cred.; prereq., M.&M. 128. Messrs. Ryan and Palmer.
- Lect. (1) III MF; 252ME (3) I MW; 254ME  
(2) II WTh; 254ME (4) IV WF; 254ME
- Lab. (1) VII-IX W; 10P (3) VII-IX Th; 10P  
(2) VII-IX M; 10P (4) I-III Th; 10P
- 121f—Machine Design. Spur, bevel, and worm gears; flywheels and pulleys; rotating discs; belt and rope transmission; force and shrink fits; critical speeds; lubrication. 2 cred.; prereq., 24. Mr. Ryan.
- (1) VII-IX WF; 255ME (3) I-III TTh; 255ME  
(2) VII-IX MT; 225ME (4) VI-VIII Th, II-IV S; 255ME
- 122w-123s—Mechanical Engineering Design. Machine elements as applied to complete machines. Mathematical theory of lubrication; vibration analysis; stress analysis by photoelastic methods. Study of materials for special purposes, high temperatures, etc. 2 cred. per qtr.; prereq., 121. Mr. Ryan.
- 122w VII-IX MTh; 151ME  
123s VII-IX WTh; 255ME
- 125w,s—Machine Design Laboratory. Experimental studies of critical speeds, vibration, balancing, and noise in high speed machinery; complex stresses in machine parts; the use of vibrograph, oscillograph, stroboscope, photoelastic polariscope, and noise meter. 2 cred.; prereq., 121. Mr. Ryan.
- 125w Lect. VI M; 252ME  
Lab. VI-VIII F; 50ME
- 125s Lect. VI W; 254ME  
Lab. VI-IX F; 50ME

- 127w—Lubrication. Hydrodynamic theory of lubrication and applications to the design and construction of thrust and journal bearings. Pressure distribution, end leakage, film thickness, temperatures, and heat losses. 3 cred.; prereq., 121; IV MWF; 251ME. Mr. Ryan.
- 128s—Photoelastic Stress Analysis. Fundamentals of stress analysis; optics of the polariscope; studies in tension, bending, and shear; combined stresses; concentrated stresses; auxiliary equipment; Mohr's diagrams; complex stress analysis. 3 cred.; prereq., M.&M. 128. Mr. Ryan.
- 129s—Vibration Engineering. Fundamental analysis; factors influencing vibration, critical speeds; rotating, reciprocating, torsional vibration; balancing; instruments for measuring and recording vibration. 3 cred.; prereq., 121; I MWF; 252ME. Mr. Ryan.
- 221f-222w-223s—Advanced Mechanical Engineering Design. 3 cred. per qtr.; prereq., 121 and grad. Messrs. DuPriest and Ryan.
- 228f—Photoelasticity. Review of fundamentals of stress analysis; optics of the polariscope; applications of photoelasticity in tension, bending, shear and combined stresses. Use of photoelastic polariscope and solution of problems. 3 cred.; prereq., M.&M. 128; ar. Mr. Ryan.

## STEAM ENGINEERING

- 32f—Elementary Mechanical Laboratory. (Aero.E.) Calibration of pressure gages, anemometers, indicator springs. Use of steam calorimeters, planimeters, indicators. Calculations from indicator cards. Tests of mechanical appliances, lubricating oils. 2 cred.; prereq., reg. in 131. Mr. Kroeger.
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|-----------------|------------------|
| (1) VI-IX M; Ex | (4) VI-IX Th; Ex |
| (2) VI-IX T; Ex | (5) VI-IX F; Ex  |
| (3) VI-IX W; Ex |                  |
- 33f—Elementary Mechanical Laboratory. Calibration of pressure gages, anemometers, indicator springs. Use of steam calorimeters, planimeters, indicators. Calculations from indicator cards. Tests of mechanical appliances, lubricating oils. 2 cred.; prereq., reg. in 131. Messrs. Summers and Larsen.
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|--------------------------|---------------------|
| Lect. (1) VI T; 254ME    | (3) I T; 254ME      |
| (2) VI M; 254ME          |                     |
| Lab. (1) VII-IX T; 160ME | (4) VII-IX M; 160ME |
| (2) II-IV T; 160ME       | (5) VII-IX W; 160ME |
| (3) II-IV S; 160ME       | (6) VII-IX F; 160ME |
- 34w—Mechanical Laboratory. Calibration of tachometers, pyrometers, steam flow meters. Valve setting. Flow of steam through orifices. Test of steam trap, surface condenser, simple steam engines. Inspection trips. 2 cred.; prereq., 33. Messrs. Summers and Larsen.
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|-------------------------|----------------------|
| Lect. (1) I S; 254ME    | (3) VI M; 254ME      |
| (2) I Th; 254ME         |                      |
| Lab. (1) I-III F; 160ME | (4) II-IV S; 160ME   |
| (2) VII-IX W; 160ME     | (5) VII-IX M; 160ME  |
| (3) VI-VIII Th; 160ME   | (6) VI-VIII T; 160ME |
- 35s—Elementary Steam and Power Laboratory. Friction test of oils. Test of hot air engine, centrifugal fan, injector, steam pump, steam boiler. Calibration of transmission dynamometer. Power study of industrial machines. Ap-

- proximate analysis of fuels. Use of Mahler, Bomb, and Junkers calorimeters. 2 cred.; prereq., 34 and reg. in 141. Messrs. Summers and Larsen.
- Lect. (1) III Th; 251ME (3) VI Th; 251ME  
(2) III M; 251ME
- Lab. (1) I-III S; 160ME (4) VII-IX M; 160ME  
(2) VII-IX T; 160ME (5) VII-IX Th; 160ME  
(3) VII-IX W; 160ME
- 38w—Heat Engines. (Chem.E.) Study of steam properties, steam calorimetry, elementary thermodynamics, fuels and combustion. Construction, selection, and operation of steam power plant equipment. 3 cred.; prereq., Phys. 7.
- (1) II MWF; 110Ex (3) II TThS; 110Ex  
(2) VI MWF; 215Ex
- 39w,s—Heat Engine Laboratory. (Chem.E.) Calibration and use of instruments: tests of engines, boilers, compressors, and power plant auxiliaries. 1 cred.; prereq., 38 or reg. in 38. Mr. Kroeger.
- 39w (1) VI-VIII F; Ex (3) VII-IX M; Ex  
(2) VI-VIII Th; Ex
- 39s (1) VI-VIII Th; Ex (3) II-IV T; Ex  
(2) VI-VIII M; Ex
- 40f-41w—Heat Engines. (E.E.) Properties of steam; principles of operation of steam machinery; fuels, combustion, and smoke prevention; construction, operation, and testing of engines, turbines, boilers, condensers, pumps, and power plant equipment. Selection of equipment for different types of plants. 3 cred. per qtr.; prereq., Phys. 7 or 23. Messrs. Kroeger and Lee.
- 40f Rec. III WF; 110Ex  
Lab. (1) VI-VIII M; Ex (2) VI-VIII Th; Ex
- 41w Rec. III WF; 201Ex  
Lab. (1) VI-VIII T; Ex (2) VII-IX W; Ex
- 42w—Heat Engines. (C.E.) Steam generation and properties. Fuels and combustion. Construction and operation of boilers and auxiliaries. Elementary thermodynamics. Use and calibration of engine-room instruments. Types, details, and tests of steam engines, steam turbines, gas engines, and air compressors. Performance and adaptability of power equipment. 4 cred.; prereq., Phys. 7 or 23. Mr. Kroeger.
- (1) I TThS, VI W; 201Ex (2) III MWThS; 110Ex
- 131f-132w—Thermodynamics. A critical study of the properties of gases and vapors and the fundamental laws for conversion of heat energy into mechanical energy in steam engines, gas engines, air compressors, refrigeration machines, steam turbines, etc. 3 cred. per qtr.; prereq., M.&M. 25 and Phys. 9. Messrs. DuPriest, Easton, Kroeger, Larsen, and Lee.
- 131f (1) II MWF; 154ME (6) II TThS; 154ME  
(2) I TThS; 154ME (7) IV MWF; 154ME  
(3) VI MWF; 154ME (8) III MWF; 154ME  
(4) III TThS; 154ME (9) VII MWF; 154ME  
(5) I MWF; 154ME
- 132w (1) VIII-IX M, II TS, V F; 154ME (6) III TThS, VIII-IX W; 154ME  
(2) IV M, I TS, VIII-IX Th; 154ME (7) II MWF, 154ME; VI-VII M; 10P  
(3) I MWF, VI-VII T; 154ME (8) VI MWF, VI-VII Th; 154ME  
(4) III MWF, I-II Th; 154ME (9) VII MWF, VIII-IX T; 154ME  
(5) IV TS, V Th, VIII-IX F; 154ME
- 138w—General Laboratory. (a) Calibration of pressure gages and anemometers. Use of steam calorimeters. Steam indicator practice, card calculation, valve setting. Tests of steam engines, steam turbines, gas engines, air compressors,

and pumps. Physical tests of lubricating oils. (b) The use of hydraulic measuring devices, weirs, differential gages, etc. in the tests of centrifugal pumps, hydraulic turbines, and rams. 2 cred.; prereq., Min.E. 122; VI-IX Th; Ex. Messrs. Shoop and Straub.

141s-142f,w—Heat-Power Engineering. Study of fuels and combustion, stokers, furnaces, boilers, superheaters, economizers, feed water treatment, etc. Theory, practice, and economics relating to heat engines and steam generating equipment, including the auxiliary units; air, water, and steam heat exchangers and purifiers, pumps, fans, etc. 3 cred. per qtr.; prereq., 132. Messrs. Shoop, DuPriest, and associates.

141s	(1) IV TS, VI Th; 154ME	(4) III TThS; 154ME
	(2) III MWF; 154ME	(5) II TThS; 154ME
	(3) II MWF; 154ME	

142f	(1) II MWF; 252ME	(2) I MWF; 252ME
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142w	(1) I MWF; 110Ex	(2) II MWF; 201Ex
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144w—Steam Turbines. Theory and practice applied to various types, Thermodynamics and mechanical analysis of problems involved in the design of nozzles, blades, rotors, etc. Condition of operation; systems of transmission; lubrication; economy; field of service. Laboratory investigation. 3 cred.; prereq., 132; IV MWF; 201Ex. Mr. Shoop.

145w—Applied Thermodynamics. Laws of heat transmission, mean temperature difference, in condensers, boilers, brine coils, feed water heaters. Treatment of cooling towers, accumulators, multiple stills, stage evaporators, vapor refrigeration; air compressors, multi staging, intercooling, etc. 3 cred.; prereq., 132, 35; III T, 110Ex; ThS, 201Ex. Mr. Shoop.

146s—Fuels and Combustion. Fuels: classification and analyses. Hand and stoker treatment; regulation. Pulverized and liquid fuels. Types of burners, controls. Combustion; generation of heat; furnace gases; stratification; flame way; smoke prevention. Furnaces. Lectures and recitations. 3 cred.; prereq., 142; I MWF; 215Ex. Messrs. Shoop and Summers.

147w—Design of Steam Machinery. Piping systems, furnace and gas passage dimensions, stokers, oil, gas, and pulverized fuel burners, superheaters, feed water heaters, and pumps, air preheaters, automatic controls, chimneys, etc. 2 cred.; prereq., 142 or reg. in 142; VII-IX MW; 255ME. Mr. Shoop.

148s—Design of Power Plant Units. Treatment of condensers, air pumps, cooling towers, stage evaporators, reheaters, etc. 2 cred.; prereq., 147; VII-IX MT; 255ME. Mr. Shoop.

149f,w,s—Advanced Steam Laboratory. Tests of steam turbines, uniflow and compound steam engines, condensers, evaporators, and vacuum pumps. Tests of compound steam pump. Air compressor, boiler, superheater, and power plant. Studies of fluid flow meters and air-conditioning apparatus. 2 cred.; prereq., 132 and 35, 142 or reg. in 142. Mr. Shoop.

149f,w	(1) I-IV T; Ex	(2) VI-IX T; Ex
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149s	(1) I-IV T; Ex	(2) VI-IX F; Ex
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241s—Advanced Thermodynamics. Reversible changes of state and efflux of wet and superheated vapors. Flow of compressible fluids in mains, moving channels, into receivers, and communicating vessels. Gas mixtures, critical points, liquefaction. Power plant cycles: regenerative, reheating, and bleeding. 3 cred.; prereq., 145. Mr. Shoop.

- 242f-243w—Power Plant Design. Problems, designs, and estimates for power plants and central stations. Selection of motive powers, relative advantages of steam, producers, and gas plants. Choice of engines and boilers; pumps, piping, and accessories. 2 cred. per qtr.; prereq., 148. Mr. Shoop.
- 244s—Power Plant Management. Operation and maintenance of boilers, engines, steam turbines, and accessory apparatus. Smoke prevention, lubricants and lubrication. Power plant finance. Daily logs and power costs. Study of recent power researches. 3 cred.; prereq., 141. Mr. Shoop.

## INTERNAL COMBUSTION ENGINES

- 50f,w,s—Auto and Airplane Engines. Principles and types. Electrical systems. Lubrication and cooling. Carburetors. Accessories. 3 cred.; soph. Messrs. Robertson and Ford.

50f	(1) I TThS; 110Ex	(2) III TFS; 215Ex
50w	(1) I TThS; 110Ex	(2) III MW, II S; 215Ex
50s	I MWF; 110Ex	

- 55s—Internal Combustion Engines. (E.E.) Brief course in theory and laboratory, including real gas cycles, combustion, fuels and lubrication; construction and performance of gasoline, Diesel, and compression-ignition engines. 3 cred.; prereq., 41. Messrs. Robertson and Ford.

Rec.	III WF; 110Ex	
Lab.	(1) VII-IX Th; Ex	(2) II-IV S; Ex

- 150f,w—Internal Combustion Engines. Study of real gas cycles, combustion, fuels. Construction and performance. Characters of Otto, Diesel, and compression-ignition engines. Carburetion, fuel injection, cooling, lubrication. Auxiliary systems. 3 cred.; prereq., 131. Messrs. Robertson and Ford.

150f	(1) II MWF; 254ME	(3) I MWF; 254ME
	(2) III TThS; 254ME	(4) II TThS; 254ME
150w	(1) II MFS; 251ME	(2) I MWF; 251ME

- 151w—Advanced Internal Combustion Engines. Special reference to automobile, truck, and airplane engines. Theoretical consideration of fuels, combustion, detonation, lubrication, etc. 3 cred.; prereq., 150; VI MF, I S; 135E. Mr. Robertson.

- 152s—Diesel Engines. An advanced course in the theory, design, operation, and economics of the Diesel engine. 3 cred.; prereq., 150; I MWF; OSL. Mr. Robertson.

- 153w—Engine Service Management. Instruments and methods used in servicing or reconditioning automobile and airplane engines. Causes of mechanical failure and wear. Permissible tolerance in worn parts. Lubrication and ignition service. 3 cred.; prereq., 150; I MWF; OSL. Messrs. Robertson and Ford.

- 154w,s—Design of Airplane Engines. Study of the designs of radial and in-line aircraft engines. Drawing room problems, including graphical and analytical calculations of stresses in moving parts. Combined polar diagrams of bearing loads, etc. 2 cred.; prereq., 150. Messrs. Robertson and Ford.

154w	II-IV W, I-III Th; OSL
154s	II-IV W, VII-IX F; OSL

- 155s—High Speed Engine Testing. Use of modern research instruments and methods for testing. Experiments showing effect of fuel mixture, distribution, spark timing, etc., upon general engine performance. 2 cred.; prereq., 158 or 159; VII-IX MT; OSL. Mr. Robertson.
- 156w,s-157s—Design of Internal Combustion Engines. Detailed study of design of automotive and stationary engines. Problems, including calculation of cylinders, bearing loads, stresses in moving parts, and valve mechanisms. 2 cred.; prereq., 121, 150 for 156, 154 or 156 for 157. Messrs. Robertson and Ford.
- 156w II-IV W, I-III Th; OSL  
156s-157s II-IV W, VII-IX F; OSL
- 158f,s—Aero Engine Testing. The use of modern instruments for testing gasoline, Diesel, and aircraft engines. The use of dynamometers and torque stands in determining engine performance. 2 cred.; prereq., 150 or reg. in 150. Mr. Robertson.
- 158f (1) III-IV M, VI-IX F; OSL (2) III-IV, VI-IX M; OSL  
158s (1) VI-IX T, II-III Th; OSL (3) II-III Th, VI-IX Th; OSL  
(2) II-III M, VI-IX W; OSL
- 159f,w,s—Internal Combustion Engine Laboratory. Tests of gasoline, semi-Diesel, and Diesel engines. Power plant units and automotive engines. 2 cred.; prereq., 150 or reg. in 150. Messrs. Robertson and Ford.
- 159f (1) VI-IX T; Ex (2) VI-IX W; Ex  
159w (1) VI-IX T; Ex (2) VI-IX F; Ex  
159s (1) I-IV T; Ex (2) VI-IX W; Ex
- 250f,w,s—Dynamics of High Speed Engines. Advanced study of inertia forces; balancing high speed multi-cylinder engines; engine torque analysis; torsional vibration, etc. Conferences, assigned readings, and problems. 3 cred.; prereq., 121, 150. Mr. Ford.
- 251f-252w-253s—Automotive Vehicles. A study of transmission systems, running gears, chassis, bodies, riding qualities of vehicles, and current developments; lecture and problems. Cred. ar.; grad. only. Messrs. Robertson and Ford.
- 254s—Automobile Fleet Maintenance. Study of available types of motor coaches and trucks, their design features from a maintenance viewpoint, a survey of service depot requirements with a study of fleet service methods and maintenance practice. 3 cred.; prereq., 150. Mr. Robertson.
- 255f-256w-257s—Automobile Testing and Research. Dynamometer and road tests including over-all efficiency of cars at various speeds, fuel consumption, effect of road surface on traction, efficiencies, and general performances. Special research problems. 2 cred. per qtr.; prereq., 55 or 159. Mr. Robertson.
- 258s—Motor Truck and Bus Transportation. Problems involving motor truck transportation, capacity of trucks, trailers, drawbar pull. Efficiencies. Effect of road surface. Freight handling. Analysis of costs of truck operation and maintenance. Relative costs of transportation. 3 cred.; prereq., 152. Mr. Robertson.

## HEATING, VENTILATION, AND REFRIGERATION

- 160f—Heating and Ventilation. Principles of heating, ventilation, and air conditioning. Warm air, steam, hot water, vapor, vacuum, and fan systems of heating; pipe systems; heat regulation. Ventilation and air conditioning, cen-



- tral station heating. 3 cred.; prereq., 131, M.&M. 127, 129. Messrs. Rowley, Algren, and Jordan.
- Lect. (1) III W; 201Ex (2) VI M; 201Ex  
 Rec. (1) II ThS; 201Ex (2) IV TS; 201Ex  
 or III ThS; 201Ex or I ThS; 201Ex
- 161w-162s—Heating, Ventilation, and Air Conditioning Design. Calculations of heating and cooling loads; selection and arrangement of equipment; design of complete heating, ventilation, and air conditioning systems for various types of buildings. 2 cred. per qtr.; prereq., 160. Messrs. Algren and Jordan.
- 161w II-IV T, I-III Th; 255ME  
 162s I-IV T, I-II Th; 229E
- 164s—Heating and Ventilation. (Arch.) Principles of heating, ventilation, and air conditioning. Heating systems; furnaces, steam, hot water, vapor, vacuum and fan blast. Piping systems. Ventilation, air conditioning, and methods of control. 2 cred.; prereq., M.&M. 92; I TTh; 110Ex. Messrs. Rowley and Algren.
- 165w—Advanced Heating, Ventilation, and Air Conditioning. Requirements for comfort, health, and industrial processes. Thermodynamics of air vapor mixtures. Heating, cooling, humidification, dehumidification. Atmospheric impurities, sources, classifications, methods of elimination. Air supply and distribution. Methods of control and application. 3 cred.; prereq., 160; IV MWF; 110Ex. Messrs. Rowley and Algren.
- 166s—Refrigeration. Principles of refrigeration. Various types of refrigerating machines, refrigerants, applications to ice making, cold storage, and air conditioning. 3 cred.; prereq., 132; IV MWF; 110Ex. Messrs. Rowley and Algren.
- 167s—Advanced Heating, Ventilation, and Air Conditioning. Special problems including air conditioning, heat transfer, heating and cooling loads, solar radiation, etc. Equipment and test methods. 3 cred.; prereq., 160; I MWF; 201Ex. Mr. Rowley.
- 169f,w,s—Heating and Ventilation Laboratory. Tests of heating, ventilation, and air conditioning equipment. The determination of air qualities as required for comfort and for specific industries. Tests and studies of complete installation. 2 cred.; prereq., 35, 160 or reg. in 160. Messrs. Algren and Jordan.
- 169f (1) I-IV T; Ex (2) VI-IX W; Ex  
 169w (1) I-IV T; Ex (2) VI-IX F; Ex  
 169s (1) VI-IX W; Ex (2) VI-IX F; Ex
- 197w—Mechanical Equipment of Buildings. Investigation of heating, ventilating, refrigerating, power, elevator, fire protection, and special equipment for large buildings. Disposal of wastes, light distribution, communication, and plumbing. Lectures, inspection trips, reports with equipment layouts. 3 cred.; prereq., 160, Phys. 9.
- 265f,w,s—Advanced Heating, Ventilation, and Air Conditioning. Taken in connection with research work in the laboratory. Cred. ar.; grad. only; prereq., 160. Mr. Rowley.

## INDUSTRIAL ENGINEERING

- 70f—Mechanical Technology. Study of mechanical processes involved in various manufacturing industries and in the development and utilization of power. Lectures by various specialists. 1 cred.; open only to soph., jr., and sr.; IV T, III Th; 305E. Mr. Richards.

- 74s—Safety Engineering. Safety of the workers; fire and other hazards; prevention of industrial accidents. Compensation laws. Fire prevention; construction; automatic sprinkler systems. Effect of safety on production. Factory sanitation. Safety organization. Lectures, assigned reading, factory inspections, and reports. 3 cred.; prereq., 72. Mr. Koepke.
- 77s—Manufacturing Costs. Determination of factory costs as applied to quantity production. Collection, analysis, and distribution of the costs of labor, materials, and overhead, together with the factors which control costs. 3 cred.; prereq., 72. Mr. Koepke.
- 83s—Elementary Industrial Engineering. Evolution of modern manufacturing methods and resulting changes in factory costs, labor relationships, and management problems. 3 cred.; prereq., 72, Econ. 9. Mr. DuPriest.
- 170s—Tool and Jig Design. The design of tools, jigs, dies, and fixtures for manufacturing interchangeable parts. Two lectures, one three-hour laboratory. 3 cred.; prereq., 72, 171. Mr. Crowder.  
Lect. VI W, I Th; 202ME  
Lab. I-III T; 255ME
- 171f,w—Production Control. Detailed study of principles used to facilitate factory production. The theoretical considerations involved in getting materials and machines co-ordinated to produce products at minimum costs. 3 cred.; prereq., 72. Messrs. Koepke and Laitala.  
(1) IV MWF; 202ME (2) II MWF; 202ME
- 172w—Industrial Plants. Geographical location, design, and layout of industrial plants. Includes discussions on lighting, heating, ventilation, sanitation, distribution of power, material handling equipment. Lectures and laboratories. Laboratory work includes problems taken directly from local plants. 3 cred.; prereq., 171, 174; I TS, 202ME; I-III Th, 205ME. Messrs. Koepke and Laitala.
- 173s—Industrial Organization. Problems involved in organizing and controlling factory organizations. 3 cred.; prereq., 172; I MWF; 202ME. Mr. Koepke.
- 174f,w,s—Motion and Time Study Laboratory. Training in motion and time study as a tool in industrial management. Wage systems, rate setting. Particular emphasis on cost reduction due to better methods. One lecture, one three-hour laboratory. Laboratory problems taken directly from local industries. 2 cred.; prereq., 72, 171, or B.A. 89, or reg. in 171. Mr. Laitala.
- 174f Lect. III W; 202ME  
Lab. (1) VI-VIII T; 205ME (3) VII-IX F; 205ME  
(2) VI-VIII W; 205ME
- 174w Lect. III W; 202ME  
Lab. (1) II-IV T; 205ME (3) VI-VIII T; 205ME  
(2) VII-IX W; 205ME
- 174s Lect. III F; 202ME  
Lab. (1) II-IV T; 205ME (3) VI-VIII Th; 205ME  
(2) VI-VIII W; 205ME
- 175w—Materials Handling. Detailed study of equipment necessary for economical transportation and storage of materials and parts during the process of manufacturing; economic considerations involved in the selection of proper type of material handling equipment, arrangements for storing, checking, and issuing materials. 2 cred.; prereq., 172 or reg. in 172. VI M, VI-VII F; 205ME. Mr. Laitala.

- 179s—Industrial Relations. The relations of a personnel department to industrial engineering. Foreman training, job analysis, service departments. Lect. and lab. 3 cred.; prereq., 171. Mr. Laitala.
- 277f-278w-279s—Industrial Engineering Problems. Special investigations of practical problems and suggested methods of procedure. Lectures, assigned reading, shop visits, and reports. 3 cred. per qtr.; grad.; prereq., 173, 174. Mr. Koepke.

## GENERAL

- 181f—Railway Technology. Systematic course of visits to the various railroad shops in the vicinity to study locomotive details and classifications. Locomotive practice. 2 cred.; prereq., M.&M. 127, 128, 129. Mr. Summers.
- 189s—Hydraulic Machinery. Theory of operation, design, construction, and regulation of water turbines. Turbine testing; characteristics, selection of type. Cost of turbines and water power. 3 cred.; sr.; prereq., M.&M. 129.
- 190f-191w-192s—Seminar. Reading of assigned articles in current technical press. Classroom presentation of principal features of assigned articles. 1 cred. per qtr.; sr.
- 190f VI F; 335EE  
191w VI W; 335EE  
192s II S; 335EE
- 193s—Engineering Economics. The cost factor in engineering problems as affected by plant location, kinds of products, size of industry, transportation, marketing, class of labor, etc. Allocation of costs, sunk costs, excess production costs, break even costs, ultimate economy, estimating, specifications, and contracts. 3 cred.; prereq., jr. or sr. in engineering; I MWF; 154ME. Mr. DuPriest.
- 194f,w,s—Advanced Engineering Problems. Opportunity will be offered for carrying on special investigations in the various fields of mechanical engineering. 2 to 4 cred.; registration by permission of the division chief in charge of work. Open only to sr. M.E.
- 195s—Inspection Trip. During the spring vacation of the senior year an inspection trip is made to various industrial plants to study mechanical equipment, manufacturing methods and processes. Required of senior mechanical engineers. 1 cred. Mr. Rowley.
- 290f-291w-292s—Mechanical Engineering Research. Investigations in connection with lubrication, fuels, furnaces, boilers, steam engines, turbines, gas engines, heating and ventilation, industrial and other engineering problems. Cred. as ar. per qtr.; grad. Registration by permission of the division chief in charge of work.

## METALLURGY

- 1f—Assaying. Lectures on the fire assaying of ores and metallurgical products. Theory of sampling, balance manipulation, furnaces, slag calculations, oxidation, reduction, special methods, etc. 2 cred.; prereq., Chem. 5 or equiv.; I MWF; 108M. Mr. Schlechten.
- 2f—Assaying Laboratory. Application of the principles of fire assaying. Practical determination of gold, silver, and lead in ores and metallurgical products. Metallurgists 3 cred.; prereq., reg. in Met. 1; VI-IX WF; 7M. Messrs. Pease and Schlechten.

- 3f—Assaying Laboratory. Application of the principles of fire assaying. Practical determination of gold, silver, and lead in ores and metallurgical products. 1 cred.; miners, geologists, and petroleum engineers; prereq., reg. in Met. 1; VI-IX W or VI-IX F; 7M. Messrs. Pease and Schlechten.
- 11w—Metallurgy of Pig Iron. Raw materials, construction, and basic principles of the blast furnace process. Chemistry of the process. Fluxes and slags. Principles for controlling operation and products. 3 cred.; prereq., Chem. 5 or equiv.; I MWF, III Th; 108M. Mr. Joseph.
- 12s—Metallurgy of Steel. Steel producing processes and various types of steel. Modern furnace construction. Chemistry of refining processes. The application of protective coatings to steel products. 3 cred.; prereq., 11; III MWF, I Th; 108M. Mr. Scott.
- 13s—General Ferrous Metallurgy. Short course for mining, petroleum, mechanical, electrical, or chemical engineers. The basic principles of the production of pig iron and its refining into steel. Construction of blast furnaces and steel furnaces. Chemistry of iron and steel processes. 2 cred.; prereq., Inorg. Chem. 16 or equiv.; I MWF; 108M. Messrs. Joseph and Scott.
- 14w—Metallurgy of Copper, Lead, and Zinc. Short course for mechanical, electrical, or chemical engineers. Methods of extraction, recovery, smelting, and refining. 3 cred.; prereq., Inorg. Chem. 8 or equiv.; IV MWF; 108M. Mr. Pease.
- 106f—Metallurgy of Base Metals. Consideration of principles, methods, and appliances used in smelting and refining of lead, copper, zinc, and other non-ferrous metals. Lectures and recitations. 2 cred.; prereq., 12 or 13; III TThS; 108M. Mr. Pease.
- 107w—Metallurgy of Base Metals. Continuation of Course 106. 2 cred.; prereq., 106; III TThS; 108M. Mr. Pease.
- 108s—Metallurgy of Precious Metals. Principles, methods, and appliances used in amalgamation, concentration, cyanidation, smelting, and refining of gold, silver, and other precious metals. 2 cred.; prereq., 107; III TThS; 108M. Mr. Pease.
- 110f—Ore Dressing. A study of jaw and gyratory crushers, ball mills, rod mills, tube mills, volumetric sizing, gravimetric sizing. Concentration by tables, jigs, bowl classifiers, log washers, and miscellaneous devices used in ore dressing. 2 cred.; prereq., Geol. 24; III MWF; 202M. Mr. Searles.
- 111f—Ore Dressing Laboratory. A practical examination of ores and use of ore dressing machinery as outlined in Course 110. 1 cred.; prereq., with 110; VI-IX F; 203M. Mr. Searles.
- 112w—Ore Dressing. A study of the principles involving flotation. Special attention to chemical and physical action of the different reagents used, such as frothing, collecting, depressing, activating, conditioning, etc. Also a study of liberation and particle size, grinding circuits and flotation machinery. 2 cred.; prereq., 110; III MWF; 202M. Mr. Searles.
- 113w—Ore Dressing Laboratory. A practical examination of ores by flotation. This course involves the grinding, use of proper reagents, and examination of products. 1 cred.; prereq., reg. in 112; VI-IX F; 203M. Mr. Searles.
- 114s—Ore Dressing. An advanced course designed primarily for Group A metallurgists. A continuation of Course 112 giving more detailed study of ore dressing problems. 2 cred.; prereq., 113; III MWF; 202M. Mr. Searles.

- 115s—Ore Dressing Laboratory. Special problems in ore dressing involving the use of the microscope. A study of polished sections to determine the minerals present, grain size, and association of minerals. 1 cred.; prereq., 114, Geol. 165; VI-IX W; 203M. Mr. Searles.
- 116s—Ore Dressing Laboratory. A course designed for students of mining and geology. The course incorporates a part of Course 111 and Course 113. 1 cred.; prereq., 112; VI-IX Th; 203M. Mr. Searles.
- 121f—Ore Testing (Iron Ores). Methods of beneficiation, principles, methods and machines, concentration, formulae, metallurgical and economic considerations. 2 cred.; prereq., 110. Mr. Davis.

Lect. VI F; MEx

Lab. VII-IX F; MEx

- 122w—Ore Testing. Determination of methods for metallurgical and economic extraction of nonferrous metals from ores. Involves amalgamation, concentration, and cyanidation. Lecture and laboratory. 4 cred.; prereq., 121. Mr. Pease.

Lect. III MW; 108M

Lab. VI-IX MW; 7M

- 123s—Ore Testing. Continuation of Course 122. Consideration of factors affecting extraction. Study of distribution of values in mill and metallurgical products. 4 cred.; prereq., 122. Mr. Pease.

Lect. III MW; 109M

Lab. VI-IX MW; 7M

- 124—Special Problems in Ore Testing. Detailed study of ore testing, problems. Causes of nonextraction. Methods of correction. Relation of values. Cred. and hrs. ar.; prereq., 112. Mr. Pease.

- 125—Special Problems in Ore Testing. Continuation of Course 124. Cred. and hrs. ar.; prereq., 124. Mr. Pease.

- 126s—Special Problems in Metallurgy for Miners. Study of metallurgical problem in relation to mine development. Conferences, together with laboratory work. 3 cred.; prereq., 121. Mr. Pease.

Lect. II TS; 108M

Lab. VI-IX W; 7M

- 130-131-132—Special Problems in Metallurgy. Seminar work on metallurgical problems. Cred. and hrs. ar.; prereq., sr. Met.E. or grad. Messrs. Joseph and Pease.

- 133w—Electrometallurgy. Application of electricity to thermometallurgy. Design and operation of electric furnaces and their use in smelting of metals and in the production of ferro alloys. 3 cred.; prereq., 12. Mr. Scott.

Lect. I TThS; 108M

Lab. VI-VIII W; 7M

- 134f—Advanced General Metallurgy. Refractories, fuels, and principles of combustion. Thermochemistry of important reactions in process metallurgy. 4 cred.; prereq., 12. Mr. Joseph.

Lect. II MWF; 108M

Lab. VI-IX Th

135w—Advanced Metallurgy of Iron and Steel. Detailed study of the blast furnace process. Economics of raw materials, their size, preparation, and physical properties. Control of slag-metal reactions. Trend in furnace design and practice. 4 cred.; prereq., 134. Mr. Joseph.

Lect. II MWF; 108M

Lab. VI-IX Th

136s—Advanced Metallurgy of Iron and Steel. A detailed study of steel processes and current problems in controlling quality of product. The physical chemistry of steel making and its application to production problems. 4 cred.; prereq., 135. Mr. Scott.

Lect. II MWF; 111M

Lab. VI-IX F

137w—Metallurgical Problems (Nonferrous). Conferences, lectures, and laboratory on selected problems. 4 cred.; prereq., 108. Mr. Pease.

Lect. IV TS; 108M

Lab. I-II TTh, VI-IX F; 7M

138s—Metallurgical Problems (Nonferrous). Continuation of Course 137. 4 cred.; prereq., 137. Mr. Pease.

Lect. I F, II S; 108M

Lab. I-II TTh, VI-IX Th; 7M

139su—Field Work in Metallurgy. Study of metallurgical operations at mills, smelters, and refineries. Detail reports are required covering plants visited. 6 cred.; 3 weeks beginning about September 1. Mr. Pease.

141f-142w-143s—Special Problems. Special problems in the production of iron and steel. Conferences, laboratory work. 3 cred. per qtr.; prereq., sr. Met.E. or grad. Messrs. Joseph and Scott.

141f III W, VI-IX MT

142w III-IV, M, VI-VIII T, VI-IX F

143s VI T, VI-IX MW

175su—Field Trip. Study of metallurgical operations in important iron and steel centers. 6 cred.; prereq., jr. year; three weeks beginning about September 1. Mr. Joseph or alternate.

204-205-206—Special Problems in Advanced Metallurgy. Intended primarily for research work for graduate students. Cred. and hrs. ar. Messrs. Joseph and Pease.

#### METALLOGRAPHY

150f—Metallography for Electrical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; study of typical alloys with special reference to electrical resistance, conductivity, magnets, etc. Laboratory work and demonstrations. 3 cred.; jr., sr. E.E. Mr. Forsyth.

Lect. I TS; 315M

Lab. VII-IX M; 17M

152f—Metallography for Aeronautical Engineers. Principles; metallography of iron and steel with special reference to alloy steels, and light alloys used

in airplane construction. Laboratory work and demonstrations. 3 cred.; prereq., sr. Aero.E. Messrs. Dowdell and Jerabek.

Lect. I TS; 315M

Lab. (1) VI-VII M; 17M

(3) VI-VII W; 17M

(2) VIII-IX M; 17M

(4) VIII-IX W; 17M

153f-154w-155s—Metallography. (Long course for metallurgical engineers.) Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Laboratory work. 4 cred. per qtr.; prereq., Met.E. 12 or equiv. Mr. Forsyth.

153f-154w Lect. I MWF; 315M

Lab. VI-IX T; 307M

155s Lect. I MWS; 315M

Lab. VI-IX T; 307M

156w—Metallography for Mechanical, Mining, and Petroleum Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; metallography and heat treatment of iron and steel. Laboratory work. 3 cred.; prereq., jr., sr. M.E., Min.E., or Pet.E. Mr. Dowdell.

Lect. III ThS; 315M

Lab. (1) VII-IX W; 307M

(2) VII-IX F; 307M

157s—Advanced Metallography for Mechanical, Mining, and Petroleum Engineers. Metallography of alloy steels, tool steels, high speed tool steels, and important nonferrous alloys; metallography applied to engineering practice and specifications. Outside reading and special reports. Laboratory work. 3 cred.; prereq., 152, 156, or 160. Mr. Dowdell.

Lect. IV MW; 315M

Lab. VII-IX F; 307M

160f,w—Metallography. (Chem.) Principles of metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, their microscopic examination and photomicrographs; typical alloy systems such as iron carbon (steel, cast iron), and some nonferrous alloys. Lab. work; 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Jerabek.

160f Lect. III MF; 111M

Lab. (limit 20 students per section)

(1) VI-VIII Th; 17M

(3) I-III S; 17M

(2) VI-VIII F; 17M

160w Lect. III MF; 111M

Lab. (limit 20 students per section)

(1) VI-VIII M; 17M

(3) VII-IX F; 17M

(2) VI-VIII W; 17M

161w—Advanced Metallography. (Chem.) Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. 3 or 4 cred. depending on lab.; prereq., 152, 156, or 160. Mr. Jerabek.

Lect. IV MWF; 109M

Lab. VI-VIII Th; 307M

- 162s—Advanced Metallography. (Chem.) Metallography of the nonferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. 2 or 3 cred. depending on lab.; prereq., 152, 156, or 160. Mr. Jerabek.  
Lect. III MF; 111M  
Lab. VI-VIII Th; 307M
- 163f—Advanced Metallography. Seminar work on recent advances in metallography. Lectures and recitations, with outside reading and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I TThS; 306M. Mr. Dowdell.
- 164w—Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I TThS; 306M. Mr. Dowdell.
- 165s—Advanced Metallography. Technical metallography as applied to the automotive industry. Lectures and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I MWF; 306M. Mr. Dowdell.
- 166f-167w-168s—Laboratory. Laboratory work on special problems in ferrous, nonferrous, and X-ray metallography. 3 cred. per qtr.; prereq., 155. Mr. Dowdell.  
166f Lect. III W  
Lab. VI-IX MT  
167w III-IV M, VI-VIII T, VI-IX F  
168s Lect. VI T  
Lab. VI-IX MW
- 170f-171w-172s—Special Problems in Metallography. Seminar work in metallographic problems. Cred. and hrs. ar.; prereq., sr. Met.E. or grad. Messrs. Dowdell, Jerabek, and Forsyth.
- 201f-202w-203s—Advanced Metallography for Graduate Students. Intended primarily for research work. Mr. Dowdell.
- 210f-211w-212s—Thesis Courses for Graduate Students. Intended primarily for research work. Cred. and hrs. ar. Mr. Dowdell.

#### MILITARY SCIENCE AND TACTICS

All physically fit male students in the Institute of Technology who are citizens of the United States may take instruction in military science for three hours each week as prescribed for the Basic Course, Senior Division, R.O.T.C. Students registered in Electrical Engineering are assigned to the Signal Corps, all others in Engineering, Architecture, Chemistry, and Mines are assigned to the Coast Artillery (anti-aircraft), except that students whose programs will render them eligible for the Advanced Course of Signal Corps in the cryptographic, photographic, or supply specialties may be assigned to that unit by arrangement.

The University allows six credits for the two years' Basic Course. These credits may be applied as elective credits in qualifying for a degree.

Students who have completed the Basic Course, may be selected for advanced work by the professor of military science and tactics. Those who pursue the



Advanced Course are required to sign an agreement with the government to continue the two years' course to completion. This includes attendance at a six weeks' training camp, normally held during the summer following the first year of advanced work. The camp is conducted free of cost to the student, and in addition, while actually in camp, the student receives pay. Students pursuing the Advanced Course are also furnished a special uniform and receive a fixed allowance per day. The total government compensation for the two years' advanced work amounts to something over \$200. Students who satisfactorily complete the Advanced Course will be commissioned in the Officers' Reserve Corps of the United States Army.

The University allows 18 credits for the two years' Advanced Course of the Coast Artillery Corps (5 hrs. per week) and 15 credits for the Advanced Course of the Signal Corps (4 hrs. per week). These credits may be applied towards graduation.

1f-2w-3s—First Year Basic Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery soldier, with special reference to anti-aircraft equipment and methods; weapons and materiel; organization; leadership; military history; obligations of citizenship; courtesies and customs of the service; marksmanship; national defense and the R.O.T.C.; military sanitation and first aid; map reading. 1 cred. per qtr.; prereq., M.&M. 9 and Draw. 10.

1f-2w†

Class Sections (Limited to 120 students)

- |               |               |
|---------------|---------------|
| (1) I MW; A   | (4) VII MW; A |
| (2) III MW; A | (5) IX MW; A  |
| (3) V MW; A   | (6) I TTh; A  |

Leadership Sections

- |              |               |
|--------------|---------------|
| (1) I F; A   | (6) I S; A    |
| (2) III F; A | (7) VIII W; A |
| (3) V F; A   | (8) VIII F; A |
| (4) VII F; A | (9) II S; A   |
| (5) IX F; A  |               |

- |                        |                       |
|------------------------|-----------------------|
| 3s (1) I M, V, IX T; A | (4) VII M, V, IX T; A |
| (2) III M, V, IX T; A  | (5) IX M, V, IX T; A  |
| (3) V M, V, IX T; A    | (6) I, V, IX T; A     |

Signal Corps. Duties of the signal corps soldier; relationship of the citizen to his government; military history; field telephone and telegraph systems; equipment and operation; discipline and courtesies; national defense and the R.O.T.C.; sanitation and first aid; army organization; map reading; leadership. 1 cred. per qtr.; prereq., reg. in E.E. or by arrangement with instructor.

1f Same as Coast Artillery

2w (1) V MW; 321EE (2) VI MW; 321EE  
One hour in Coast Artillery leadership section.

3s (1) VIII M, V, IX T; A (2) V, VII, IX T; A

4f-5w-6s—Second Year Basic Course, R.O.T.C.

Coast Artillery. Duties of noncommissioned officer of Coast Artillery; weapons and materiel; motor transportation; aircraft identification and

† Students must register in both class and leadership section.

characteristics; position finding and fire control for seacoast and anti-aircraft artillery. 1 cred. per qtr.; prereq., 1-2-3, M.&M. 11, 12, or equiv.

- 4f (1) II MWF; A (4) VIII MWF; A  
(2) IV MWF; A (5) II TThS; A  
(3) VI MWF; A
- 5w† Class Sections (Limited to 100 students)  
(1) II MW; A (4) VIII WF; A  
(2) IV WF; A (5) II ThS; A  
(3) VI WF; A
- Leadership Sections (Limited to 80 students)  
(1) II M; A (4) VIII M; A  
(2) IV M; A (5) II T; A  
(3) VI M; A (6) IV T; A
- 6s† Class Sections (Limited to 100 students)  
(1) II M; A (4) VIII M; A  
(2) IV M; A (5) II T; A  
(3) VI M; A
- Leadership Section (All students)  
V, IX T; A

Signal Corps. Duties of the signal corps noncommissioned officer; field radio telegraph and telephone systems and equipment; code practice, radio procedure and table sets; signal communication for all arms; leadership. 1 cred. per qtr.; prereq., 1-2-3.

- 4f (1) III MWF; 321EE (2) VII MWF; 321EE
- 5w† (1) II WF; 321EE (2) III WF; 321EE
- One hour in Coast Artillery leadership section.
- 6s (1) III M, V, IX T; A (2) II, V, IX T; A

151f-152w-153s—First Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery officer; aerial photographic reading; leadership; basic gunnery, methods of adjusting fire, principles of probability; position finding, gunnery and fire control for anti-aircraft artillery; administration; defense against chemical warfare; signal communications; orientation. 3 cred. per qtr.; prereq., 4-5-6.

- 151f (1) II MTWThF; A (3) VI MWF, V TTh; A  
(2) IV MTWFS; A
- 152w (1) II MTWTh; A (3) VI MW, V TTh; A  
(2) IV MTWF; A

Any one of the nine leadership sections 2w or any of the six 5w hours. Limit of six students per section.

- 153s (1) II MWF, V, IX T; A (3) VI MWF, V, IX T; A  
(2) IV MWF, V, IX T; A

Signal Corps. Duties of signal corps officer; message center procedure; homing pigeons; cryptography; aerial photograph reading; defense against chemical warfare; administration; division organization; installation and operation of field telephone, telegraph, and radio sets; signal communication tactics and transmission of decisions in form of orders to subordinates; leadership. 4 class and lab. hrs. per week. 2 cred. per qtr.; prereq., 4-5-6 and reg. in E.E. 64-65-66 or by arrangement with instructor.

- 151f IV MTWF; 321EE
- 152w IV MWF, 321EE and one hour in Coast Artillery leadership section.
- 153s III V, IX T, III W; 321EE

† Students must register in both class and leadership section.

154f-155w-156s—Second Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of coast artillery officer; command and leadership; military history and policy; military law, surveying and orientation, field engineering; property procurement; combat orders; seacoast and anti-aircraft; artillery tactics. 3 cred. per qtr.; prereq., 151-152-153.

154f (1) I MWF; IX W or F; A (3) VI MWF, IX W or F; A  
 (2) IV MWF; IX W or F; A  
 Any one of the nine 1f leadership sections. Limit of 10 students per section.

155w (1) III MWF, VIII-IX W or F; A (3) IV TTh, II S, VIII-IX W or F; A  
 (2) IV MWF, VIII-IX W or F; A

156s (1) I MWF, V, IX T; A (3) VI MWF, V, IX T; A  
 (2) IV MWF, V, IX T; A

Signal Corps. Duties of the signal corps officer; military law; training management; handling of property and funds; orientation as a reserve officer; common battery telephony; military history and policy; leadership; military cryptography; property procurement; motor transportation. 4 class and lab. hrs. per week. 3 cred. per qtr.; prereq., 151-152-153, E.E. 64-65-66 or equiv.

154f (1) I MWF, IX W or F; A (3) VI MWF, IX W or F; A  
 (2) IV MWF, IX W or F; A

155w VII MWF, V T; 321EE

156s V, VIII, IX T, II W; 321EE

MINING AND PETROLEUM ENGINEERING

MINING

11f-12w-13s—Mine Surveying. Theory and problems in mine surveying, including U. S. land subdivision, foreign methods of land description, stadia measurements, triangulation, railroad curves and cross sections, earthwork computations, areas by co-ordinates, differential and trigonometric leveling, plane-table surveying, topographic map reading, solar and stellar observations for latitude and meridian, surveying of mining claims and bore holes, shaft plumbing and underground traversing and leveling. 3 cred. per qtr. fall, winter; 2 cred. spring qtr.; prereq., Dr. 13, M.&M. 12. Messrs. Lambert and Heilig.

11f Lect. III MWF; 315M  
 Quiz V M; 315M

12w Lect. III MWF; 315M  
 Quiz V S; 315M

13s Lect. III MW; 315M  
 Quiz III F; 315M

14s—Field Work. General work in plane surveying and adjustment of instruments. 5 cred.; prereq., 11, 12; VI-IX MWF, VI-VIII T, V-IX Th. Messrs. Lambert and Heilig.

15su—Field Trip. Field work on the iron ranges of Minnesota. Surveying of an underground mine, including shaft plumbing. Survey of open-pit mine including an estimate of the surface stripping. Solar and stellar observations for latitude and meridian. 8 cred.; prereq., 13, 14; 4 weeks beginning about June 15. Messrs. Lambert and Heilig.

106f—Mine Mapping. Mine mapping in accordance with prevalent practice in various mining districts including a map of the mine surveyed during the sophomore field trip. Ore estimating, based on current practice. 2 cred.; prereq., 15; VI-IX TTh; 205M. Mr. Lambert.

- 107w—Mine Mapping. Mapping mine surveyed during the field trip. 1 cred.; pre-req., 15; VI-VIII W; 205M. Mr. Lambert.
- 111f—Exploration. Prospecting, boring drill steel, drill bits. 3 cred.; pre-req., Geol. 105; I MWFS; 202M. Mr. Heilig.
- 112w—Exploration and Development. Explosives and blasting; timbering and timber treating; tunneling and drifting. 3 cred.; pre-req., 111; I MWF, II S; 202M. Mr. Heilig.
- 113s—Development and Exploitation. Shaft sinking, raising, stoping, mining methods; support of excavations. 3 cred.; pre-req., 112; I MWF, II S; 202M. Mr. Parker.
- 120s—First Aid. This course is given by members of the United States Bureau of Mines staff and all students must have completed the course and received the U.S.B.M. certificate before graduation. One week, 3 hrs. per day.
- 121f-122w-123s—Mine Plant. Discussion of the machinery and appurtenances employed in the equipment of mines. Air compression, rock drills, mechanical features of hoisting, pumping, ventilation, underground transportation. Electricity applied to mining. 3 cred. per qtr.; pre-req., M.&M. 33, Phys. 8. Mr. Comstock.
- 121f            II MTWFS; 202M  
122w-123s    II MTWThF; 202M
- 124f—Mining Hydraulics. Application of hydraulic principles to mining and metallurgical problems. Flow measurements and stream gaging. Diversion dams, flumes, and laws of flow. Transporting power of water. Handling of slimes, sands, etc. 4 cred.; pre-req., M.&M. 127; III MTWThS; 111M. Mr. Heilig.
- 125f—Metallurgical Hydraulics. Application of hydraulic principles to metallurgical problems. Flow measurements. Diversion dams, flumes, and laws of flow. Transporting power of water. Handling of slimes, sands, etc. 3 cred.; II TThS; 111M. Mr. Heilig.
- 126f—Engineering Construction. Theory of structure, loading, analytic and graphic resolution of stresses in frame structures, stresses in ore bins, head frames, etc. 3 cred.; pre-req., M.&M. 127; VII-VIII T, VI-IX Th, III-IV F; 303M. Mr. Heilig.
- 127w—Engineering Construction. Design of structures for mining and petroleum plant. 3 cred.; pre-req., 126; II-III M, II-IV W, VII-IX F; 303M. Mr. Heilig.
- 130s—Mine Rescue. One week's intensive course in the use of oxygen breathing apparatus. Course is given by members of the staff of the United States Bureau of Mines and is required of all mining and petroleum engineering students. One week, 3 hrs. per day.
- 138—The Stone Industries. Monumental and building stones, crushed stone, sand and gravel plants and operations. 2 cred.; pre-req., 112; 202M. Mr. Parker.
- 139su—Practical Mining (Field Trip). Study of mining operations, mine plant, and mining in one or more mining camps. 6 cred.; pre-req., jr. year. Three weeks beginning about September 1. Mr. Parker.
- 141f—Report and Administration. Examinations and reports; valuation and amortization; depletion and depreciation; taxation; corporations; capitalization; stocks and bonds; contracts and specifications. 3 cred.; pre-req., 113; IV MTWF; 202M. Mr. Parker.

- 142w—Coal Mining. Coal mining methods; mechanization; tippie arrangements and coal preparation; mine gases; safety lamps and tests; safety work and organization; labor organizations and agreements. 3 cred.; prereq., 141; IV MTFs; 202M. Mr. Parker.
- 143s—Mining Law, Quarries, and Placers. Mineral laws and court interpretations; mining laws of foreign countries; state mining codes and accident prevention. Placer mining, panning, rockers, sluicing, hydraulicking, dredging and underground methods. Quarries: requirements, methods of working, machines used, and field for product. 3 cred.; prereq., 142; IV MTWF; 202M. Mr. Parker.
- 144w-145s—Advanced Mining. Preparation of a report on a mining property or some phase of the mineral industry. 3 cred. per qtr.; prereq., 113; 303M. Mr. Parker.
- 144w II-III TW, VI-IX T; 303M
- 145s VI-IX TTh; 303M
- 146—Nonmetallic Minerals. Mining and preparation of cement, lime, gypsum, refractories, ceramic materials, fillers, pigments. 2 cred.; prereq., 112; 112M. Mr. Parker.
- 147—Earth Handling and Excavation. Excavation by shovels, draglines, dredges; handling materials by railroad, trucks, conveyors, and sluices. 2 cred.; prereq., 112; 205M. Messrs. Comstock and Parker.
- 151f-152w-153s—Special Problems in Mining. Seminar work on mining problems. Cred. and hrs. ar.; prereq., reg. in 141-142-143. Mr. Parker.

## PETROLEUM ENGINEERING

- 111f—Oil Field Development. Principles of drilling and completing oil wells and a study of the methods and equipment involved. Problems and methods of protecting oil wells. Also considered are such special problems as present practices of field development, well survey problems, securing formation information, and well records. 3 cred.; prereq., Geol. 105; I MWFS; 112M. Mr. Lacabanne.
- 112w—Oil Field Production. Principles of producing oil; drainage and flow of oil in porous formations; phase relation problems of oil and gas; principles and methods of lifting oil in a well. Secondary methods of securing greater oil extraction from a field, problems and treatment of oil field emulsions, and problems of the disposal of oil field waters are also considered. 3 cred.; prereq., 111; I MWFS; 112M. Mr. Lacabanne.
- 131s—Petroleum Refining. A survey of distillation and fractionation processes used in making commercial products from crude petroleum. Physical and chemical properties of petroleum. Cracking and polymerization. 2 cred.; prereq., Inorg. Chem. 16, Phys. 7; III MW; 112M. Mr. Lacabanne.
- 134s—Petroleum Plant. Mechanical features of drilling equipment, gas lift, pumping, natural gasoline extraction. Special devices for abnormal conditions. Oil emulsions. Mechanical features of transmission lines for oil and gas. Flow formulas, soil corrosion and prevention. 2 cred.; prereq., Min.E. 122; I MWF; 112M. Mr. Comstock.
- 135su—Field Work. Study of equipment and operations in one or more oil fields. 6 cred.; prereq., jr. year. Three weeks beginning about September 1. Mr. Lacabanne.

138s—Oil Field Mapping. Oil and gas well logs, property, contour, and sub-surface maps. Cross section and correlation maps, oil well survey plates. Methods of displaying data and records, graphical, stereograms, peg models. 2 cred.; prereq., Min.E. 107; VI-IX M, VI-VII Th; 205M. Mr. Lacabanne.

144w-145s—Advanced Petroleum Engineering. Lectures on explosives, rock drilling and blasting, oil well shooting. Shaft sinking and timbering, timber treating, marine foundations, and caissons with reference to use in petroleum industry. Coal mining methods, oil shale and oil sand mining. Proration, unitization, and legal problems of the industry. Valuation, amortization, and depletion. Preparation of a report on the exploration and development of an oil property or some phase of the industry. 5 cred. per qtr.; prereq., 141. Mr. Parker.

144w Lect. I MWF, II S; 109M  
Lab. VI-IX T, II-III W; 303M

145s Lect. II MTWF; 315M  
Lab. VI-IX T, VI-VII Th; 303M

152f-153w-154s—Petroleum Production Technology. Special problems in oil and gas production. Mud fluids, formation correlations, electrical and mechanical coring, oil well cements, oil flow and drainage through porous formations, water analysis, oil shales, and miscellaneous production problems. 3 cred. per qtr.; prereq., 112. Mr. Lacabanne.

152f Lect. VI F; 112M  
VI-VII MW, VII-VIII F; 112M

153w Lect. II Th; 112M  
Lab. II-III T, VI-IX Th; 112M

154s Lect. II S; 112M  
Lab. III-IV T, VI-IX W; 112M

155-156-157—Special Problems in Petroleum Engineering. Seminar in petroleum problems. Cred. and hrs. ar.; prereq., reg. in 144-145. Messrs. Parker and Lacabanne.

### NAVAL SCIENCE AND TACTICS\*

The Course in Naval Science and Tactics is divided into two groups. Navigation and Naval Science, the latter being further divided into two parts: the Basic Course consisting of the work of the first two years and requiring one hour of drill and two hours of classroom work per week; the Advanced Course consisting of the work of the last two years and requiring one hour of drill and two hours of classroom work per week.

The Navigation Course requires three hours of classroom work per week. It is covered in three quarters at the convenience of the student but should be completed during the Basic Course.

Credits for the summer cruises are given in the amount of  $\frac{3}{4}$  credit for each two weeks of cruise work. These credits are in excess of degree requirements and do not reduce the number of credits required for a degree in the student's major.

Naval science and navigation credits are accepted as fulfilling the requirement for a degree. For the Basic Course  $1\frac{1}{2}$  credits per quarter are allowed—a total of  $4\frac{1}{2}$  credits for each of the two years. For the Advanced Course 2

\* All students must be interviewed by the professor of naval science and tactics, given a special physical examination, and selected for the course before registering for Naval Science 1.

credits per quarter are allowed students with an engineering major—a total of six credits for each of the two years.

For Navigation Courses 3 credits per quarter are allowed—a total of 9 credits for the course.

Uniforms and equipment are furnished to students by the government without charge. All textbooks used are loaned to the student. All Naval R.O.T.C. students attending cruises are furnished transportation and subsistence. Students enrolled in the Advanced Course are paid monthly commutation of subsistence by the Navy Department, and cruise pay on the Advanced Course cruise. The total pay received from the government amounts to about one hundred ninety dollars (\$190) for the two years in the Advanced Course.

## NAVAL SCIENCE

### *Basic Courses*

1f—First Year Basic. 1½ cred.; no prereq.

- (1) III MWF; A  
(2) VI MWF; A

- (3) VII MWF; A  
(4) VIII MWF; A

2w—First Year Basic. 1½ cred.; prereq., 1.

All sections drill V T; A

- (1) III MW; A  
(2) IV WF; A

- (3) VI TTh; A  
(4) VIII WF; A

3s—First Year Basic. 1½ cred.; prereq., 2.

All sections drill IX T; A

- (1) I TTh; A  
(2) III TTh; A

- (3) VII MW; A  
(4) VII Th, III S; A

4f—Second Year Basic. 1½ cred.; prereq., 3.

- (1) II TThS; A  
(2) IV MWF; A

- (3) VIII MWF; A

5w—Second Year Basic. 1½ cred.; prereq., 4.

All sections drill V T; A.

- (1) II TTh; A  
(2) IV MT; A

- (3) VII MW; A

6s—Second Year Basic. 1½ cred.; prereq., 5.

All sections drill IX T; A

- (1) I WF; A  
(2) IV MW; A

- (3) VI TTh; A

### *Advanced Courses*

7i—First Year Advanced. 2 cred.; prereq., 6; I MWF; A.

8w—First Year Advanced. 2 cred.; prereq., 7; V T, I WF; A.

9s—First Year Advanced. 2 cred.; prereq., 8; IX T, I WF; A.

## NAVIGATION

Navigation courses given by the Department of Naval Science and Tactics are open to all university students.

1f,s—Elementary Navigation and Piloting. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, dead reckoning. Three hours per week for one quarter. 3 cred.; prereq., M.&M. 12.

- 1f (1) VI MWF; A  
1s (1) I MWF; A

- (2) VII MWF; A  
(2) IV MWF; A

2f,w—Celestial Navigation. Lines of position, the sextant, the astronomical triangle, time and the chronometer, marine surveying, star identification. Three hours per week for one quarter. 3 cred.; prereq., Nav. 1.

2f (1) I MWF; A (2) IV MWF; A  
2w (1) I MWF; A (2) VI MWF; A

3w,s—Deep Sea and Aerial Navigation. Determination of lines of position of sun, moon, stars, and planets. Short tabular methods. The navigator's day's work at sea. Chart work and practical problems. 3 cred.; prereq., Nav. 2.

3w (1) IV MWF; A (2) VII MWF; A  
3s (1) VI MWF; A (2) VII MWF; A

### PHYSICAL EDUCATION FOR MEN

The courses in sports education are offered by the Department of Physical Education to men students of the University for the purpose of providing instruction and practice in sports of a recreational nature in which men may participate in future years as a means of obtaining recreation, regular exercise, and social intercourse.

A towel and locker fee of \$1.25 per quarter is charged all students taking exercise courses.

The University furnishes uniforms to students for class work or recreational play for \$1 per quarter.

The facilities of the Department of Physical Education including the golf course, tennis courts, gymnasium, swimming pools, handball and squash courts, golf gymnasium, table tennis room, and playing fields, are available for use by the general student body. All men are invited to participate in some form of physical activity. For information regarding the intramural and intercollegiate athletic programs see the physical education handbook published by the Department of Physical Education for Men or inquire at the offices in Cooke Hall.

Elective with credit if taken for three quarters.

### SPORTS EDUCATION

Supervisor of Sports Education: Mr. Piper.

1f,2w,3s†—Sports Education.

Survey Course	II MWF	
	III MWF	
	IV MWF	
Fall: Touchball, Swimming, Volleyball, Badminton		
Winter: Boxing, Wrestling, Basketball, Golf		
Spring: Soft Ball, Tennis, Handball, Squash Racquets		
Badminton	VI MWF (w)	
Beginning Swimming	II MWF	
Intermediate Swimming	II TThS	
Advanced Swimming	III MWF (w,s)	
Lifesaving	III TThS	
Miscellaneous Swimming	VI MWF	
Boxing	VIII MWF } Fall and	
	IX MWF { winter only	
Tennis	VII MWF	Spring only
Individual Physical Education Activities	III MWF	
(by special permission)	IV MWF	
	VIII MWF (f,w)	
	VII MWF (s)	

† Three credits are given when three quarters are completed.



Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

### PHYSICAL EDUCATION FOR WOMEN

Women students registering in any curricula in the Institute of Technology requiring G.E. 13, Orientation, will substitute one quarter of Phys. Ed. 1, 2, 3, 4, 5, or 6, General Course in Physical Education for this course.

Consult the Combined Class Schedule for hours and statement of fees.

### PHYSICS‡

1f-2w-3s—Introduction to Physical Science. Lectures and experimental demonstrations of the principles underlying physical phenomena. Open to students in architecture. 3 cred. per qtr.; all; prereq., M.&M. 9 or equiv; III MWF; 166Ph. Mr. Buchta.

7f,w‡-8w,s‡-9f,s‡—General Physics. Mechanics, heat, sound, light, and electricity. Laboratory work an integral part of the course. 5 cred. per qtr.; all; prereq., reg. in M.&M. 24.

- |    |   |  |
|----|---|--|
| 7f | Lect. (1) III MTWF; 150Ph<br>(2) II MWThF; 150Ph  | (3) VI MWThF; 150Ph  |
|    | Quiz* (1) IX Th; 150Ph<br>(2) IX M; 150Ph   | (3) IX T or Th; 150Ph  |
|    | Lab. (1) I-II M; ar<br>(2) III-IV M; ar<br>(3) VI-VII M; ar<br>(4) VIII-IX M; ar<br>(5) I-II T; ar<br>(6) III-IV T; ar<br>(7) VI-VII T; ar (Chem.,<br>Chem.E. only)<br>(8) VIII-IX T; ar (Mines only)<br>(9) III-IV w; ar | (10) VI-VII W; ar<br>(11) VI-VII Th; ar (Chem.,<br>Chem.E., Phys. only)<br>(12) VIII-IX Th; ar (Chem.,<br>Chem.E. only)<br>(13) I-II F; ar<br>(14) III-IV F; ar<br>(15) VI-VII F; ar<br>(16) I-II S; ar<br>(17) III-IV S; ar (Chem.,<br>Chem.E. only)    |
| 7w | Lect. II MWThF; 166Ph<br>Quiz II S; 150Ph<br>Lab. (1) VI-VII M; ar<br>(2) VI-VII W; ar<br>(3) VI-VII F; ar  | (4) VIII-IX Th; ar<br>(5) III-IV S; ar   |
| 8w | Lect. (1) III MWFS; 150Ph<br>(2) II MWThF; 150Ph<br>Quiz* (1) IX T; 150Ph<br>(2) VII T; 166Ph or IX M; 150Ph  | (3) VI MWThF; 150Ph<br>(3) IX Th; 150Ph  |
|    | Lab. (1) I-II M; ar<br>(2) III-IV M; ar<br>(3) VI-VII M; ar<br>(4) VIII-IX M; ar<br>(5) I-II T; ar<br>(6) III-IV T; ar<br>(7) VI-VII T; ar<br>(8) VIII-IX T; ar (Chem.,<br>Chem.E. only)<br>(9) I-II W; ar                | (10) III-IV W; ar<br>(11) VI-VII W; ar<br>(12) VI-VII Th; ar (Chem.,<br>Chem.E. only)<br>(13) VIII-IX Th; ar (Chem.,<br>Chem.E. only)<br>(14) I-II F; ar (Chem., Chem.E. only)<br>(15) VI-VII F; ar (Mines only)<br>(16) I-II S; ar<br>(17) III-IV S; ar |

\* The quiz section must correspond to the lecture section.

‡ A fee of \$2 per quarter is charged for this course.

† See announcement in regard to substitute for formal prerequisites on page 87.

- 8s Lect. II MWThF; 166Ph  
 Quiz VIII T; 150Ph  
 Lab. (1) VI-VII M; ar (4) VIII-IX Th; ar  
 (2) VI-VII W; ar (5) III-IV S; ar  
 (3) VI-VII F; ar
- 9f Lect. II MWThF; 166Ph  
 Quiz II S; 150Ph  
 Lab. (1) VI-VII M; ar (4) VIII-IX Th; ar  
 (2) VI-VII W; ar (5) III-IV S; ar  
 (3) VI-VII F; ar
- 9s Lect. (1) III MTWF; 150Ph (3) VI MWThF; 150Ph  
 (2) II MWThF; 150Ph  
 Quiz\* (1) III Th; 150Ph (3) VI T; 150Ph  
 (2) II S or VIII Th; 150Ph  
 Lab. (1) I-II M; ar (10) VI-VII W; ar (Chem.,  
 Chem.E. only)  
 (2) III-IV M; ar (11) I-II Th; ar  
 (3) VI-VII M; ar (12) VI-VII Th; ar  
 (4) VIII-IX M; ar (13) VIII-IX Th; ar  
 (5) I-II T; ar (14) III-IV F; ar  
 (6) III-IV T; ar (15) VI-VII F; ar  
 (7) VI-VII T; ar (Chem., (16) I-II S; ar  
 Chem.E. only) (17) III-IV S; ar  
 (8) VIII-IX T; ar (Chem.,  
 Chem.E. only)  
 (9) I-II W; ar (Chem.,  
 Chem.E. only)

29f—Introduction to Meteorology. A presentation of the fundamental physical principles underlying meteorological phenomena, accompanied by instrumental observations and weather map study. 3 cred. per qtr.; all; prereq., high school phys. or equiv.; VI MWF; 133Ph. Mr. Miller.

52w,s‡—Laboratory Arts. 3 cred.; prereq., 15 cred. in phys. and approval of dept.; VI-VIII TTh; 39Ph.

61w—Introduction to Geophysical Prospecting. Qualitative discussions of the application of physical measurements to the location of petroleum and mineral deposits together with some applications of geophysical methods to problems of shallow geologic structure. 3 cred.; jr., sr.; prereq., general course in physics, M.&M. 12; ar. Mr. Wetzel.

100f-102w-104s—Intermediate Physics. 3 cred. per qtr.; all; prereq., calculus and 15 cred. in phys. Mr. Buchta.

100f II TS, III Th; 145Ph

102w-104s II TThS; 145Ph

101f-103w-105s—Theoretical Physics. An analytical survey of fundamental principles of mechanics, sound, heat, light, electricity, and magnetism, designed to supplement the general course and to prepare students for more specialized graduate courses. 5 cred. per qtr.; jr., sr., grad.; prereq., 15 cred. in phys. and Differential Equations or reg. in Differential Equations; III MTWThF; 145Ph. Mr. Rumbaugh.

107f-109w-111s—Modern Physics. 3 cred. per qtr.; prereq., 15 cred. in phys.; I TThS; 145Ph. Mr. Nier.

110w‡-112s‡§—Modern Experimental Physics. 3 or 4 cred. per qtr.; prereq., 144; VI-IX TTh; 145Ph. Mr. Williams.

113w—Intermediate Acoustics. 3 cred.; prereq., M.&M. 25, 15 cred. in phys.; ar.

\* The quiz section must correspond to the lecture section.

‡ A fee of \$2 is charged for this course.

§ Students may enter any quarter.

- 114f-116w-118s—Elementary Physical Investigation. 3 cred. per qtr.; prereq., 15 cred. in phys. Staff.
- 124w‡—Pyrometry. Experimental study of the principles underlying temperature. One lecture, two three-hour sessions in the laboratory a week. 3 cred.; prereq., 15 cred. in phys.; VII-IX MW, or ar.; 241Ph. Mr. Miller.
- 126s‡—Advanced Heat. Temperature standards, expansion, calorimetry. Kinetic theory of matter. Change of state and heat transfer. Lecture and laboratory. 3 cred.; prereq., 15 cred. in phys.; VII-IX MW, or ar.; 241Ph. Mr. Miller.
- 131f—Geometrical and Physical Optics. 3 cred.; prereq., 15 cred. in phys.; ar.; 342Ph. Mr. Valasek.
- 134f,w‡—Experimental Optics. 3 or 4 cred.; prereq., 15 cred. in phys.; VII-IX MF; 348Ph. Mr. Valasek.
- 136w,s‡—Spectrum Analysis. 3 or 4 cred.; prereq., 15 cred. in phys.; VII-IX MF; 348Ph. Mr. Valasek.
- 144f‡—Electricity Measurements. Devoted mainly to the study of potentiometer methods, capacitance, inductance, magnetic flux. One lecture, one quiz hour and two two-hour laboratory periods a week. 3 cred.; prereq., 15 cred. in phys., M.&M. 25. Mr. Rumbaugh.
- Lect. II Th; 133Ph  
Quiz III S; 133Ph  
Lab. (1) VI-VII MF; 231Ph (4) VI-VII TTh; 231Ph  
(2) VIII-IX M, VI-VII W; 231Ph (5) VIII-IX TF; 231Ph  
(3) III-IV T, VIII-IX Th; 231Ph
- 146w‡—Advanced Electricity Measurements. Thermionics, vacuum tube circuits. 3 cred.; prereq., 144 and permission of instructor; ar.; 232Ph. Mr. Rumbaugh.
- 152s—X Rays. Study of the nature and production of X rays. 3 cred.; prereq., 15 cred. in phys.; I MWF; 166Ph. Mr. Valasek.
- 154w‡—X-Ray Spectroscopy. 3 cred.; prereq., 15 cred. in Phys. 152, M.&M. 25 and permission of instructor; ar. (Not offered in 1941-42.)
- 161f-162w—Principles of Geophysical Prospecting. Quantitative discussions of theory, instruments and interpretation of data for seismic, electric, gravitational, and magnetic geophysical methods. 3 cred. per qtr.; jr., sr., grad.; prereq., general course in physics, M.&M. 25; ar. Mr. Wetzel.
- 164f-165w-166s—Special Problems in Geophysics. Cred. and hrs. ar.; prereq., 161. Mr. Wetzel.
- 181f-183w-185s—Atomistic and Elementary Quantum Mechanics. Atomic structure, X ray, spectrum analysis, and an introduction to wave mechanics. 3 cred. per qtr.; sr., grad.; prereq., 101-103-105, or reg. in 101-103-105. Mr. Bardeen.

## PHYSIOLOGICAL CHEMISTRY

- 100f,su-101w,su—Physiological Chemistry. The components of the animal body; foods, digestion, and excreta, and metabolism. Prereq., physics, organic chemistry. 222 hours; 13 credits. Mr. Burr, Dr. Armstrong, Mr. Samuels, Dr. Arnow, Mr. Barnes, Mr. Mickelson.

100f Lect. IV MTWF; MeS Aud  
Quiz I F

Lab. (1) I-III MW; 310MH (3) I-III ThS; 310MH  
(2) I-III MW; 310MH (4) I-III ThS; 310MH

‡ A fee of \$2 is charged for this course.

101w Lect. IV TS, VI F; MeS Aud

Quiz VI T

Lab. (1) I-III MW; 310MH

(2) I-III MW; 310MH

(3) I-III ThS; 310MH

(4) I-III ThS; 310MH

153f,w,s,su—Problems in Physiological Chemistry. Special work arranged with qualified students. May be taken one or more quarters. Prereq., 100, 101; cred. ar.; ar. Mr. Burr, Dr. Armstrong, Mr. Samuels, Dr. Arnow, Mr. Barnes.

154f,w,s—Review of Current Literature in Physiological Chemistry. Cred. ar. Mr. Burr, Dr. Armstrong, Mr. Samuels, Dr. Arnow, Mr. Barnes.

155f,w,s—Seminar in Dental and Oral Biochemistry. Cred. ar. Dr. Armstrong.

180f—General Survey of Colloid Chemistry. 3 cred.; prereq., Physiol. Chem. 103.

182s—Colloids in Biology and Medicine. 3 cred.; prereq., Physiol. Chem. 180.

200f,w,s—Seminar in Physiological Chemistry. 11 hrs.; 1 cred. Mr. Burr, Dr. Armstrong, Mr. Samuels, Dr. Arnow, Mr. Barnes.

205f,w,s,su—Research in Physiological Chemistry. Cred. ar. Mr. Burr, Dr. Armstrong, Mr. Samuels, Dr. Arnow.

## POLITICAL SCIENCE

1f-2w†-3s—American Government and Politics—Parts 1 and 2. National, state, and local. Constitutions and fundamental laws; governmental organizations; divisions and separation of powers; legislative, executive, and judicial procedure and problems. Part 3. Principal functions and services of government; defense, law enforcement, regulation of business, public works, and social services. 9 cred.; all; no prereq. Messrs. Christensen and Kirkpatrick.

(1) VII MWF; BuAud

(2) IV MWF; BuAud

## RHETORIC

(College of Agriculture, Forestry, and Home Economics)

22f,w,s,†—Public Speaking. Practical course in fundamentals of speech making. 3 cred.; prereq., Engl. 6. Messrs. Nichols and Drake.

22f (1) I MWF; 311En(UF)

(2) I TThS; 310En(UF)

(3) II MWF; 310En(UF)

22w (1) I MWF; 311En(UF)

(2) I TThS; 307En(UF)

(3) II MWF; 311HH(UF)

(4) II TThS; 311En(UF)

22s (1) II TThS; 307En(UF)

(2) III MWF; 311En(UF)

(4) II TThS; 311En(UF)

(5) III MWF; 311En(UF)

(6) IV MWF; 311En(UF)

(5) III MWF; 311En(UF)

(6) III TThS; 311En(UF)

(7) IV MWF; 311En(UF)

(3) III TThS; 307En(UF)

23s†—Public Speaking. 5 cred.; prereq., Engl. 6; IV MTWFS; 311En(UF).

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per quarter is charged for this course.

## SOILS

9w—Soils. Origin, formation, physical properties, moisture relations, principles of soil fertility, use of lime, commercial fertilizers, and stable manure; soil organisms and green manures; tillage. 4 cred.; no prereq.; II MTWTh; 204So(UF). Mr. Rost.

108w—Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. 3 cred.; jr., sr.; prereq., 9. Mr. McMiller.

Lect. VI W; 204So(UF)

Lab. VII-IX W, VI-VIII F; 201So(UF)

## ZOOLOGY

1f†-2w†-3s††§—General Zoology. 10 cred.; no prereq. Messrs. Minnich, Wod-  
sedalek, Dawson, and Olson.

Lect. (1) II TTh; 06Bo (Limit 320)

(3) III WF; 06Bo (Limit 320)

(2) VIII WF; 150Ph (Limit 320)

(4) IV WF; 06Bo (Limit 240)

Lab. (1) I-II MF; 101Z (Limit 150)

(5) I-II TTh; 101Z (Limit 174)

(2) III-IV MF; 101Z (Limit 174)

(6) III-IV TS; 101Z (Limit 174)

(3) VI-VII MF; 101Z (Limit 174)

(7) VI-VII TTh; 101Z (Limit 60)

(4) VIII-IX MF; 101Z (Limit 174)

14f†-15w†—General Zoology. Structure, physiology, embryology, classification, and evolution of animals. Textbook, lectures, laboratory, and quizzes. 3 cred. per qtr.; no prereq. Mr. Dawson.

Lect. VII TTh; 150Ph (Limit 288)

Lab. (1) V-VI TTh; 101Z (Limit 114)

(2) VIII-IX TTh; 101Z (Limit 174)

† The entire course must be completed before credit is received for any quarter.

‡ A fee of \$1 per quarter is charged for this course.

§ Students should elect lecture sections in which they can continue throughout the three quarters. Changes from one lecture or laboratory to another may be made only with the consent of the department office.

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*The Bulletin of the*  
UNIVERSITY of MINNESOTA

The College of Science, Literature, and the Arts  
1941-1942

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Volume XLIV, Number 37

June 5, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

## ADMINISTRATION

The administrative officers of the College of Science, Literature, and the Arts are:

John T. Tate, Ph.D., D.Sc., Dean (219 Administration Bldg.)

T. Raymond McConnell, Ph.D., Associate Dean (219 Administration Bldg.)

Joseph M. Thomas, Ph.D., Assistant Dean for the Senior College (217 Followell Hall)

William H. Bussey, Ph.D., Assistant Dean for the Junior College (106 Followell Hall)

Royal R. Shumway, B.A., Assistant Dean for Students' Work and Chairman of the Students' Work Committee (219 Administration Bldg.)

The Students' Work Committee consists of the three assistant deans.

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## GENERAL INFORMATION

1. **Courses of study.**—The courses of study offered to students of this college are summarized on pages 11-12 and are described on pages 23-53. "Studies for Freshmen" are listed on pages 13-22.

2. **Admission.**—This college admits those students who have met the admission requirements as published in the University's Bulletin of General Information and who give reasonable promise of carrying successfully the courses of study offered in this college. The case of each individual applicant will be decided on the evidence of his previous record either in secondary school or college, or his performance in such aptitude and placement tests as are found reliable for this purpose, and comments, advice, or recommendations received from teachers or officials of the institutions previously attended. In the case of students transferring from other collegiate institutions, corresponding information will be taken into account in determining their status in this college.

3. **Admission to the freshman year.**—Students are admitted to this college either by certificate from an accredited secondary school or by examination. For details concerning the requirements in either case consult the Bulletin of General Information for 1941-42, pages 33-39.

**NOTE.**—The method of admission by examination is especially recommended to high school graduates who have shown superior ability in their high school work but who cannot present the proper units for admission by certificate. Entrance tests given by the University are of the objective type, intended to measure aptitudes for college work rather than specific information in high school fields. No special preparation for the tests is practicable.

4. **Adult special students.**—Persons of maturity (at least 24 years of age) who desire to pursue a special and limited course of study may be admitted by the Students' Work Committee as adult special students. The registration of such students will be under the control of the committee.

Application for registration as an adult special student should be made not later than September 15, December 15, or March 15, depending upon the quarter the candidate desires to enter the college.

5. **Admission to advanced standing.**—The following rules govern students entering this college with advanced standing from some other institution.

- a. Credits of advanced standing are provisional and are finally adjusted by the Students' Work Committee after the student has completed a year's residence. Credits which have been forfeited may be recovered by special examination.



- b. A student entering with advanced standing must earn an average of one honor point per credit for all work in this college counted for graduation or for admission to the Senior College.
- c. A student admitted to the Senior College and failing to meet this requirement may be excluded from the Senior College at any time after the first quarter.

6. **Examinations for advanced standing.**—Any student upon first registration at the University may, with the approval of the Students' Work Committee, be allowed without charge to take examinations for advanced standing in subjects in which the student declares himself to be prepared. Such examinations must be taken within the first six weeks of residence.

7. **Examinations for credit.**—Credit for work done outside of class may be obtained by taking a special examination. Applications should be made to the assistant dean for students' work. If approved, such an examination will be given by a committee appointed by the assistant dean for students' work. Unless the Students' Work Committee directs otherwise, the fee for such an examination will be five dollars.

8. **Examinations to demonstrate proficiency in prerequisite courses.**—Any student who wishes to carry a course for which he does not have the prerequisite may apply to the assistant dean for students' work for permission to take an examination to demonstrate his proficiency in the prerequisite. A satisfactory showing in the examination will admit the student to the course but will not entitle him to credit in the prerequisite course. There is no fee for this examination.

9. **Registration.**—Students are required to register on the days announced in the university calendar. Only in very exceptional circumstances will a student be allowed to register thereafter, and no student will be enrolled after the first week of the quarter. (See paragraph 12, Privilege Fees.)

10. No student will receive credit for work for which he is not properly registered.

11. **Fees.**—All university fees are subject to modification without notice.

Tuition fee (per quarter)	
Residents of Minnesota .....	\$25.00
Nonresidents .....	50.00
Credit hour tuition fee (unclassified students, auditors, and others carrying less than full work)	
Residents of Minnesota.....	2.25
Nonresidents .....	4.50
Incidental fee (per quarter).....	8.50
Matriculation deposit‡ (first quarter only) .....	10.00
Special fees	
Fees for individual courses are specified in the course announcements (See <i>Combined Class Schedule</i> ).	
Examination for removal of condition .....	1.00
Examination for credit (after first 6 weeks in residence) .....	5.00
Special examination .....	5.00
Laboratory deposit (required of students registered for courses in chemistry) .....	5.00
Graduation fee .....	7.50

‡ Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University.

Music fees (in addition to tuition) for those electing music

Courses 11 to 27

1 individual lesson per week, 2 credits.....\$25.00

2 individual lessons per week, 4 credits..... 50.00

Class lessons in Courses 11C, 12C, 2 credits..... 15.00

Courses A, B, C and Courses D, E, F

1 individual lesson per week, no credit.....\$25.00

Practice fees

Organ‡ (per hour) .....\$0.20 to 0.40

Piano‡ (per quarter)..... 5.00

12. **Privilege fees.**—The fee for the privilege of late registration or late payment of fees is \$2 through the third day of classes, on the fourth day the fee is \$2.50, and then increases 50 cents per day to a maximum of \$5. The fee for late change of registration is \$2.

13. **Auditors.**—Under certain conditions stated below students may be enrolled as auditors and may hear lectures and class discussions regularly without being required to do the work of the course. No regular student may be admitted to classes as an auditor until his junior year.

14. Any mature person not a regular student may be admitted as an auditor to any course under the following regulations:

a. He shall get an auditor's card at the office of the dean of the college (219 Administration Building) and on it secure the written approval of the instructor in charge of the course, and of the dean.

b. He shall present such approval to the registrar and pay the usual fee charged for regular membership in such a course. See paragraph 11.

15. Attendance as an auditor does not entitle one to credit or to admission to regular examinations in the course.

16. Any Senior College student may register as an auditor under the same regulations, with this understanding—that unless he has at least a B average, the courses for which he registers both as regular student and as auditor must not exceed the permissible maximum. (See paragraph 2 on page 8.) If he has at least a B average he may register as an auditor for an additional three-credit course.

17. **Grades.**—Four grades, A, B, C, and D, are given for work of varying degrees of merit. The grade D permits a student to register for continuation or dependent courses; and work completed with this grade is counted toward graduation when combined with work of A or B grade in other courses. The grade C indicates work of a quality acceptable for graduation; the grades B and A are given for work of higher degrees of excellence.

Work of inferior grade is marked E (condition) or F (failure). Work which is of at least D grade but, because of circumstances beyond the student's control, not completed, may be marked I (incomplete).

18. **Credits and honor points** are used for convenience in indicating amount and quality of work.

Amount of work is expressed in *credits*. Each credit demands on the average three hours a week of a student's time; that is, one recitation with two hours of preparation, or three hours of laboratory work.

Quality of work is indicated by *honor points*. Honor points are assigned to the various grades on the assumption that work of a quality acceptable for gradua-

‡ Pianos and organs are available for practice purposes upon payment of practice fees charged by the Music Department.

tion is graded at least C. (See paragraph 17.) Each credit with the grade of C carries one honor point; each credit with the grade of B, two honor points; each credit with the grade of A, three honor points. The grade of D carries no honor points. The grade of F carries minus one honor point per credit. The penalty cannot be removed by repeating the course with a passing grade.

A student who maintains an average of one honor point per credit is proceeding normally to fulfill the requirements for graduation or for admission to the professional schools. By maintaining an average better than C, a student is able to reduce the amount of work which he is required to complete. (See paragraphs 33 to 35.)

19. The *grade I (incomplete)* cannot be given when the work not completed represents more than one fourth of the quarter's work.

20. An *incomplete* not removed before the end of the first month of the student's next quarter in college becomes a *condition*. The Students' Work Committee may, in special cases, extend this time limit.

21. The *grade E (condition)* is a temporary grade, representing a deficiency which may be removed without repeating the course. A student who has received a condition in a course may register for the continuation or dependent course the following quarter.

22. **Removal of conditions.**—Conditions may be removed by additional work and an examination or, in certain cases, by satisfactory work in the next quarter of the course.

23. In Classics, Geology, History, Journalism, Music, Physical Education for Women, Physics, Scandinavian, Speech, and Zoology, conditions may sometimes be removed by passing a continuation course with a grade of C or better, in which case the grade of the first quarter will be recorded as D. A student who desires to remove a condition in this way must obtain the approval of the department, and must notify the registrar's office of his intention within the first week of the quarter. No student who has already failed in the condition examination is permitted to remove the condition by this second method.

24. In the following departments, conditions may be removed only by examination: Anthropology, Architecture, Astronomy, Bacteriology, Botany, Chemistry, Child Welfare, Drawing and Descriptive Geometry, Economics, English, Fine Arts, Geography, German, Home Economics, How To Study, Human Anatomy, Library Instruction, Mathematics, Military Science and Tactics, Natural Science, Naval Science and Tactics, Philosophy, Physical Education for Men, Physiology, Political Science, Preventive Medicine and Public Health, Psychology, Romance Languages, Sociology and Social Work, and Vocational Orientation.

25. The permanent grade resulting from the removal of a condition may in no case be higher than C.

26. Examinations for the removal of conditions incurred during the fall and winter quarters are given during the first thirty days of the succeeding quarter. Examinations for the removal of conditions incurred during the spring quarter are given the week before the opening of the fall quarter.

27. A student who desires to remove a condition by examination should get from the registrar a pamphlet entitled *Condition Examination Schedule* and should follow the instructions contained therein.

28. A condition not made up within one quarter of residence becomes a failure subject to the rules governing failures.

29. The *grade F (failure)* represents a deficiency so serious that the student must repeat the course in order to obtain credit therein.

30. A student receiving a failure in any course shall not be allowed to pursue the continuation of that course the following quarter.

31. Any student receiving a failure in a course which is required in his curriculum must repeat the course the next time it is offered.

32. No course for which a student has received credit may be repeated by him to raise his grade except by special permission of the Students' Work Committee.

33. **Quality credits.**—In some curricula and parts of curricula, the number of credits required of a student may be reduced as follows: For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one; or, in other words, for each five honor points in excess of one honor point per credit, a student will be given one "quality credit."

34. This regulation applies only to the total number of credits required. It does not apply to other specific requirements of the student's curriculum. It is in force as regards

a. Admission to the Senior College, the College of Education, the School of Business Administration, the School of Dentistry, and the Course in Medical Technology.

b. The Senior College part (exclusive of courses given by the Division of Library Instruction) of any course of study, given entirely within this college, leading to the degree of bachelor of arts or bachelor of science with this restriction: To a student registered in the Senior College, quality credits will be given for excess points earned in Senior College courses but not for those earned in Junior College courses.

c. The Senior College part of the work done in this college in the combined courses in Arts and Law and Arts and Dentistry, with the restriction stated in the preceding paragraph (b).

35. This regulation is based on the well-known fact that students of high scholarship have accomplished more than those who have poorer records. Students of higher attainment are thus given the opportunity of completing the work for the B.A. degree in less than four years and entering earlier on their graduate work. Juniors and seniors with high scholastic standing are allowed the privilege of visiting classes<sup>§</sup> and of reading under direction; and students who are handicapped by outside work or poor health can thus carry less than full work and still make a normal advance toward graduation.

36. **Junior and Senior colleges.**—The Junior College, consisting of the first two years, offers instruction in the fundamental branches which are required in preparation for the courses leading to the degrees B.A. and B.S., and for the professional schools. It is expected also that its courses of study will offer preparation for various vocations or will provide a general education for those who do not complete a longer course.

The Senior College, consisting of the third and fourth years, is concerned primarily with the advanced instruction leading to the Bachelor's degrees.

Each college is under the general direction of an assistant dean.

37. Junior College students who are candidates for a degree are listed as freshmen when they have less than 39 credits; as sophomores when they have 39 credits or more.

38. The college distinguishes between Junior College courses, intended primarily for freshmen and sophomores, and Senior College courses, intended primarily for juniors and seniors.

<sup>§</sup> See paragraphs 13-16 on page 4

39. Senior College courses appear in the announcements, in the University's *Combined Class Schedule*, as open to "juniors and seniors" or to "juniors, seniors, and graduates."

40. Some Senior College courses are regularly open to Junior College students who have an average grade of at least C in the prerequisite courses. They are listed under the heading *Senior College Courses* in departmental statements in the Science, Literature, and the Arts section of the University's *Combined Class Schedule*. Other Senior College courses are open to Junior College students only by special permission of the Students' Work Committee. Requests for the special permission should be presented to Assistant Dean Bussey in 106 Folwell Hall. Courses which carry graduate credit may not be taken earlier than the third quarter of the student's sophomore year.

41. **Election of subjects in other colleges or schools.**—In the senior year, any student registered in the College of Science, Literature, and the Arts may elect not to exceed 6 credits per quarter in any other college or school of this University, provided that (1) the courses are indicated by the dean of the college or school in question and approved by the Advisory Committee of this college as suitable for such election; and (2) no duplication of subject occurs. Courses so taken are counted toward the bachelor of arts degree on the same terms as those taken in the College of Science, Literature, and the Arts.

By resolution of the Board of Regents students in any college electing work in any other college must complete the work so elected before they are allowed to come up for the degree for which they are candidates.

Seniors desiring further information regarding courses open should consult the assistant dean for the Senior College.

## GENERAL REGULATIONS

NOTE.—*Students are held individually responsible for the information contained in these pages. Failure to read and understand these regulations will not exempt a student from whatever penalties he may incur.*

1. **Amount of work.**—Students must elect at least 13 credits of work a quarter. To take less than that number, a student must secure permission from the Students' Work Committee.

2. The maximum number of credits for which a student may register is ordinarily 17. After two quarters of residence a student may register for 18 credits provided he has an average of  $1\frac{1}{2}$  honor points per credit for the two quarters *previous to the time of registration*, and no condition or failure for the quarter immediately preceding registration.

3. **Extension and Correspondence Study courses.**—No student enrolled in the college will be allowed to carry work in the Extension Division without permission of the Students' Work Committee. No student may enroll for an extension course if this would increase the number of credits for which he registers beyond the maximum allowed.

4. Credits received in university extension courses are counted as credits in this college only after the student has completed one year of work in the college.

5. **Afternoon work.**—All freshmen and sophomores are expected to elect approximately one third of their work in the afternoon.

6. **Residence.**—To secure any degree from this college a student must earn 45 credits in residence. If a student has transferred from some other college he must spend the last three quarters before graduation in residence in the Senior College and must earn a minimum of 45 credits in residence in the Senior College.

7. **Habitual bad English.**—Any student who, either in speaking or in writing, habitually uses bad English shall be reported by his instructor to the dean with all available evidence. If the dean considers this evidence sufficient, he will require the student to take without credit such further work in composition as the chairman of the Department of English may specify.

8. **Changes in registration.**—After classes have begun, no changes in registration, other than necessary changes, may be made without permission of the Students' Work Committee.

9. When a student's registration in any subject is cancelled at his own request within the first two weeks of any quarter, no standing is recorded. After that time a record of his work is obtained from his instructor. Work of the grade of D or higher will be cancelled without grade; work below the grade of D will be recorded as "dropped with the grade of F."

10. If a student is in any doubt regarding his registration or desires to make any change in it, he should consult his major adviser, the assistant dean of his college, or the chairman of the Students' Work Committee.

11. **Absences.**—No absences without excuse are to be regarded as legitimate. Both tardiness and absence are dealt with by the individual instructor on the assumption that each student is expected to do the full work of the class.

12. A student absent for any reason whatsoever is expected to do the full work of the course. He must make up work lost through delay in registration as in the case of any other absences.

13. **Delinquent students.**—Continued residence in the college is conditioned upon reasonable success in the student's work. Any student who does not make satisfactory progress in the course in which he is registered may be placed on probation by the Students' Work Committee.

14. No student is considered to have a wholly satisfactory standing who fails to secure in the course of any year the normal advance of one honor point for each credit for which he is registered.

15. **Probation.**—A student on probation is in serious danger of being excluded from college if his work does not show definite improvement. Subject to the regulations which follow, the conditions for removal from probation and the length of probation are determined for the individual student by the Students' Work Committee.

16. With the exception of students who refuse to take a serious interest in their work, no student will be excluded from this college until he has been on probation at least one quarter.

17. The period of probation continues not more than two quarters. It may be extended if the committee is convinced that failure to show marked improvement is due to causes (other than incapacity) over which the student has no control, and that these causes may reasonably be expected to disappear.

18. A student may be admitted to the Junior College on probation if his previous record either in high school or college and in any entrance tests given by the college is such as to raise serious doubt as to his ability to do satisfactory college work.

19. A student in the Junior College will be placed on probation

- a. If at the end of any quarter he is below a passing grade in 50 per cent of his work for that quarter.
- b. If at the end of two quarters' residence he has an average of less than one-half honor point per credit.
- c. If after seven quarters' residence he has an average of less than three-fourths honor point per credit.

20. A student will be admitted to the Senior College on probation if he is allowed to transfer from the Junior College with an average of less than one honor point per credit. (See the fourth paragraph under *Amount and Quality of Work*, page 25.)

21. A student in the Senior College will be placed on probation

- a. If he is below a passing grade in 40 per cent of his work.
- b. If in two quarters' residence he fails to make an average of three-fourths honor point per credit.

22. Students excluded from this college shall be recorded as (a) transferred, (b) discontinued, (c) dropped.

a. **Transferred.**—Students whose attitude toward their work is satisfactory, but who evidently are pursuing the wrong course, may be transferred to another college at the close of any quarter with the approval of the two colleges concerned and the dean of students.

b. **Discontinued.**—Students who are apparently pursuing the right course, but have been handicapped by conditions over which they have no control (ill health, necessary outside work, etc.), may be required to discontinue their registration until the committee is satisfied that the conditions under which they work are bettered. When such discontinuance takes place, at any time other than the end of the quarter, the courses for which the student is registered are recorded as cancelled without grade.

c. **Dropped.**—Students who have clearly shown by their records that they are irresponsible, and who have failed to meet the terms of their probation, shall be dropped.

23. **Readmission.**—Students excluded from college shall be allowed to return only with the permission of the Students' Work Committee.

a. Students classified as discontinued must present evidence that the conditions which hindered their work have been remedied.

b. Students who have been dropped may be required to remain out of college until the term of the next year corresponding to that in which the delinquency occurred. Such students must present satisfactory evidence that they have been employed in an occupation demanding intelligence and responsibility, or have successfully pursued subjects of an approved character. At the time when the student is dropped the Students' Work Committee will inform him what type of studies will be accepted for readmission.

24. The cancellation of a student's registration, of his own accord, will not affect his status as a delinquent student or the terms of his readmission. When a student leaves college he will be notified by the registrar's office of his status under these regulations.

25. Students who return under the provision of the preceding paragraphs will be registered on probation. Such students may be dropped at any time that their work is unsatisfactory to the Students' Work Committee.

26. **Eligibility.**—A student who is ineligible to participate in extracurricular activities because of a condition may become eligible by removing the condition.

A student who is ineligible because of failure in a course required for graduation may become eligible (a) by repeating the course with a passing grade, or (b) by earning an average of one honor point per credit on a program of at least fifteen credits during the quarter immediately preceding participation. The two terms of a Summer Session may count as a quarter for this purpose.

A student who is ineligible because of a failure in a course not required for graduation may become eligible by either of the above methods or by completing one full year of work.

27. **Petitions.**—A student who wishes exception made to any rule of the college should present this request in writing to the Students' Work Committee. Petition blanks may be obtained at 219 Administration Building or 106 or 217 Folwell Hall.

Every student who desires to be heard in regard to his petition will be given such an opportunity by the committee.



## COURSES OF STUDY

### SUMMARY OF COURSES

The individual subjects of study offered to students in the College of Science, Literature, and the Arts, with information about credits and prerequisites and with a schedule of hours, days, and classrooms, are given in the University's *Combined Class Schedule*. They are listed under the following departmental headings: Anatomy, Anthropology, Architecture, Art Education, Astronomy, Bacteriology, Biostatistics, Botany, Chemistry, Child Welfare, Drawing and Descriptive Geometry, Economics, Education, English, Fine Arts, French, Geography, Geology and Mineralogy, German, Greek, History, Home Economics, How To Study, Italian, Journalism, Latin, Library Methods, Linguistics and Comparative Philology, Mathematics, Military Science and Tactics, Music, Naval Science and Tactics, Norwegian, Philosophy, Physical Education for Men, Physical Education for Women, Physics, Physiology, Political Science, Preventive Medicine and Public Health, Psychology, Sociology and Social Work, Spanish, Speech, Swedish, and Zoology. The courses open to freshmen are listed on pages 13-22 of this bulletin.

The college welcomes students who have definite intellectual interests but who do not expect to graduate or to enter one of the professional schools. Such students may continue in college as long as they maintain a satisfactory standing in the studies they elect. During their Junior College years a wide variety of courses is open to them. After that period they may continue work in their fields of interest as nonclassified students under the direction of the Students' Work Committee.

A student who is a candidate for a degree may, while registered in the College of Science, Literature, and the Arts, pursue one of the following courses, described on pages 23 to 53 of this bulletin. These curricula are subject to revision by action of the faculties of the colleges concerned.

#### **Courses given within this college:**

- I. A course leading to the degree of bachelor of arts, which includes
  1. A curriculum which provides for concentration and involves the pursuit of major and minor studies in the Senior College (pages 23-27).
  2. A curriculum in liberal arts which provides for greater breadth of training (pages 23-27).
  3. A course in preparation for Theological Training (page 27).
  4. A course in the humanities (page 28).
  5. A course with specialization in journalism (page 28).
  6. A course with specialization in Latin-American studies (page 30).
  7. A course with specialization in music (page 31).
- II. A course in library training leading to the degree of bachelor of science (page 34).
- III. A course preliminary to graduate social work leading to the degree of bachelor of arts (page 35).
- IV. Course preparing for admission to the School of Business Administration (page 36), School of Dentistry (page 38), College of Education (page 38), the Course in Nursing Education and Public Health Nursing (page 41), the Law School (page 42), and the Course in Medical Technology (page 43).
- V. A four-year course leading to the degree either of bachelor of arts or of bachelor of science with special training in military science and tactics (page 44).

VI. A four-year course leading to the degree either of bachelor of arts or of bachelor of science with special training in naval science and tactics (page 45).

**Combined arts and professional courses:**

VII. A six-year course leading to the degrees of bachelor of arts and bachelor of architecture (page 46).

VIII. A six-year course leading to the degrees of bachelor of science in law and bachelor of laws (page 47).

IX. A seven-year course leading to the degrees of bachelor of arts and bachelor of laws (page 48).

X. A seven-year course leading to the degrees of bachelor of business administration and bachelor of laws (page 48).

XI. A seven-year course leading to the degrees of bachelor of arts and doctor of dental surgery (page 49).

XII. An eight-year course leading to the degrees of bachelor of science, bachelor of medicine, and doctor of medicine (page 50).

XIII. An eight-year course leading to the degrees of bachelor of arts, bachelor of medicine, and doctor of medicine (page 52).

NOTE.—A unit of the University known as University College arranges special courses of study for individual students whose intellectual interests or professional aims are not provided for by curricula offered in other colleges of the University. For further information, consult Dean Tate, Room 143, Physics Building.

#### REGULATIONS APPLYING TO FRESHMAN ENGLISH

No student may register for any course in Freshman English without having taken a placement test.

On the basis of placement tests in English, students are:

Exempt from any requirement in English,

Permitted to choose between English A-B-C and Composition 4-5-6,

Assigned to Composition 4-5-6,

Advised to postpone their English until they have had a year of experience in college,

Required to make up minimum essentials‡ as a preliminary to Composition 4-5-6

Students who are exempt from Freshman English may register, if they wish, for English A-B-C or Composition 4-5-6, or for any Junior College courses in English, composition, or speech for which English A-B-C is the prerequisite.

English A-B-C is a 15-credit course consisting of 9 credits of literature and 6 credits of composition. Composition 4-5-6 is a 9-credit course in composition. Either course satisfies the requirement in English for graduation or for admission to the Senior College. Students who have already completed one or more quarters of Freshman English in another college should consult Professor Hillhouse, 221 Folwell Hall, before registering.

Any student who receives an A in composition in Course A or B or 4 or 5 may, upon recommendation of his instructor, be exempted from any further requirement in English.

Any student who receives an A or B in Course 4 or 5 may, upon recommendation of his instructor, elect the following quarter of A-B-C.

‡ For students who have to make up these minimum essentials, the General Extension Division of the University offers a course in "Preparatory English." It is a one-quarter course for which there is a special fee of \$7.50.

## STUDIES FOR FRESHMEN

The subjects of study which are offered to students who enter as beginning freshmen in the fall are given in the following list. § More advanced courses, for which some students will be prepared, are announced in the University's *Combined Class Schedule*. (For example, "Oral and Written French," for which a sufficient prerequisite is four years of high school French.) The letters (f,w,s) which are printed with course numbers are abbreviations for the words fall, winter, spring; they indicate the quarter in which a course is offered. Most of the courses extend throughout the year, but students may discontinue some of them at the end of the fall or winter quarter and still get credit for the parts completed. Footnotes indicated by the symbol † tell for which courses it is necessary to complete two or three quarters in order to get any credit.

## ANATOMY

(See Human Anatomy.)

## ARCHITECTURE

1f-2w-3s—Introduction to Architecture. Discussions and problems to inform prospective students about the nature of architecture as an art and a profession. 1 credit per quarter; no prerequisites; open only to students majoring in architecture.

DP-1f,w,s\*†—Drawing and Painting, Grade I. Studies in graphic expression dealing with simpler composition in form and color. 6 credits, normally 2 credits per quarter; no prerequisite.

M-1f,w,s†—Modeling, Grade I. Studies in plastic expression dealing with simpler compositions. 6 credits; normally 2 credits per quarter; no prerequisite.

## ART EDUCATION

The courses in Art Education are primarily for students who will major or minor in art in the College of Education. A limited number of Science, Literature, and the Arts students will be admitted but they should not register for any of them except Course 4-5-6 without first consulting the department about the nature of the work.

1f-2w-3s—Fundamental Experiences in Design. 3 credits per quarter; prerequisite, high school art.

4f-6w-8s\*—Drawing from Still Life and Pose. 2 credits per quarter; no prerequisite.

14f-15w-16s—Introduction to Art Education. 3 credits per quarter; no prerequisite.

14Af-15Aw-16As—Introduction to Art Education Laboratory. 2 credits per quarter; open only to those who take 14f-15w-16s; no prerequisite.

## ASTRONOMY

11f—Descriptive Astronomy. 5 credits; no prerequisite. The class meets four hours a week in the daytime and on one evening a week for observation with the telescope. The course has no winter continuation.

\* Students who want a beginning course in freehand drawing may choose any one of these three: Architecture DP-I; Art Education 4-6-8; Drawing 41-42-43.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ The courses which are open to students who enter in the winter or spring are given at the end of the list. For these students the choice is more limited; and because the courses are fewer, there is more likelihood of program conflicts.

## BOTANY

1f—General Botany. 4 credits; no prerequisite. This course may be followed in the winter and spring by laboratory courses, each for 3 credits per quarter.

## CHEMISTRY

Courses 1f-2w and 6f-7w are for students *who have not had* high school chemistry; Courses 4f-5w and 9f-10w are for those *who have had* high school chemistry. Courses 1f-2w and 4f-5w are primarily for pre dental, pre medical, and medical technology students. Courses 6f-7w and 9f-10w are for other students. Students in the five-year curriculum in nursing may take either 1f-2w or 6f-7w, but if they have had high school chemistry they should take 4f-5w and not 9f-10w.

1f-2w†—General Inorganic Chemistry. 4 credits per quarter; no prerequisite; primarily for pre dental, pre medical, and medical technology students. This course may be followed in the spring by 11s, "Qualitative Chemical Analysis," 4 credits.

4f-5w†—General Inorganic Chemistry. 4 credits per quarter; prerequisite, high school chemistry; primarily for pre dental, pre medical, and medical technology students. This course may be followed in the spring by 11s, "Qualitative Chemical Analysis," 4 credits.

6f-7w†—General Inorganic Chemistry. 5 credits per quarter; no prerequisite. This course may be followed in the spring by Course 12s, "Qualitative Chemical Analysis," 5 credits.

9f-10w†—General Inorganic Chemistry. 5 credits per quarter; prerequisite, high school chemistry. This course may be followed in the spring by 12s, "Qualitative Chemical Analysis," 5 credits.

## CHILD WELFARE

Most of the courses in Child Welfare are for sophomores, juniors, and seniors; but there is one course, 10s, "Introduction to Child Study" (2 credits; no prerequisite), which is regularly open to third quarter freshmen.

## DRAWING

41f-42w-43s\*—Technical Drawing. (a) A general course in the theory and practice of freehand drawing. (b) A modification of that course of particular interest to dental, medical, and scientific students. 2 credits per quarter; no prerequisite.

44f—Lettering. 1 credit; no prerequisite. This course has no winter quarter continuation.

## ECONOMICS

1f—Introduction to Economics. 5 credits; no prerequisite. This course may be followed in the winter and spring by 3w, "Money and Banking," 5 credits, and 5s, "Elements of Statistics," 5 credits.

Economics 20, "Elements of Accounting" (3 credits), is not open to beginning freshmen, but is regularly open to third quarter freshmen. Some students who enter college in the fall may find a place for it on their spring quarter programs.

Economics 32w-33s, "Secretarial Training: Typewriting" (1 credit per quarter), is open to a very limited number of second quarter freshmen, with the consent of the instructor.

\* Students who want a beginning course in freehand drawing may choose any one of these three: Architecture DP-I, Art Education 4-6-8, Drawing 41-42-43.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

## ENGLISH

The regular English courses for freshmen are one in composition (Course 4-5-6) and one in literature and composition (Course A-B-C). On the basis of placement tests,§ some students are assigned to Course 4-5-6; others are permitted to choose between 4-5-6 and A-B-C. Students whose standing in the placement tests is very low are required to make up minimum essentials as a preliminary to Composition 4-5-6. For such students the General Extension Division of the University offers a course in Preparatory English.§

4f-5w-6s†—Freshman Composition. 3 credits per quarter; prerequisite, placement tests.§

Af-Bw-Cs†—Freshman English. 5 credits per quarter; prerequisite, placement tests.§

The following courses are open to freshmen who are exempt from Freshman English.

21f-22w-23s—Introduction to Literature. 5 credits per quarter; prerequisite, placement tests.§ Students may enter any quarter. Students must take 21f and 22w or 22w and 23s to receive credit.

27f-28w-29s—Advanced Writing. 3 credits per quarter; prerequisite, placement tests.§ To receive credit for any part of this course a student must complete 27-28 or 27-29.

37f-38w-39s—Twentieth-Century Literature. 3 credits per quarter; prerequisite, placement tests.§ Students may enter any quarter.

## FINE ARTS

1f-2w-3s—Introduction to Art: Modern Art, Ancient and Medieval Art, Renaissance and Baroque Art. 3 credits per quarter; no prerequisite. Students may enter any quarter.

## FRENCH

1f-2w-3s—Beginning French (1f-2w) and the first part of Intermediate French (3s). 5 credits per quarter.

2f-3w-4s—The second part of Beginning French (2f) and Intermediate French (3w-4s). 5 credits per quarter; prerequisite, one year of high school French.

3f-4w—Intermediate French. 5 credits per quarter; prerequisite, two years of high school French. This course may be followed in the spring by 20s, "Oral and Written French," 5 credits.

## GEOLOGY

There are three beginning courses in geology: Course 1-2 (with or without the laboratory course A-B); Course 1-3 (with or without the laboratory course A-C); Course 8, which is a one-quarter course, without laboratory, for those who do not take geology to meet a laboratory science requirement. For a 15-credit, three-quarter sequence, students may take Courses 1f-2w-3s, Af-Bw-Cs or Courses 1f-3w-2s, Af-Cw-Bs.

1f-2w†—General Geology (Dynamic and Historical). 3 credits per quarter; no prerequisite. Students who take this course are advised to take the laboratory course Af-Bw at the same time.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ See Regulations Applying to Freshman English, page 12.

- Af-Bw—General Geology Laboratory (Dynamic and Historical). 2 credits per quarter. This course is open only to those who take 1f-2w.
- 1f-3w†—General Geology (Dynamic and Economic). 3 credits per quarter; no prerequisite. Students who take this course are advised to take the laboratory course Af-Cw at the same time.
- Af-Cw—General Geology Laboratory (Dynamic and Economic). 2 credits per quarter. This course is open only to those who take 1f-3w.
- 8f—Introductory Geology. 5 credits; no prerequisite. This course has no regular winter quarter continuation, but students who take it may, with the instructor's permission, arrange to take more courses in geology.

#### GERMAN

- 1f-2w-3s—Beginning German. 5 credits per quarter; no prerequisite.
- 2f-3w-4s—The second and third parts of Beginning German (2f-3w) and Intermediate German (4s). 5 credits per quarter; prerequisite, one year of high school German.
- 3f-4w—The third part of Beginning German (3f) and Intermediate German (4w). 5 credits per quarter; prerequisite, two years of high school German. This course may be followed in the spring by 58s, "German Pronunciation," 2 credits, or by 60s, "Narrative Prose," 3 credits.
- 3f-33w-34s—The third part of Beginning German (3f) and Medical German (33w-34s). 5 credits per quarter. This sequence is primarily for premedical students.
- 30f-31w-32s—Medical German. 3 credits per quarter; prerequisite, three years of high school German. This course is equivalent to 33w-34s.

#### GREEK

- 1f-2w†-3s—Beginning Greek (1f-2w) and Selections from Attic Prose (3s). 5 credits per quarter.

#### HISTORY

- 1f-2w-3s†—European Civilization. 4 credits per quarter; no prerequisite.
- 4f-5w-6s†—English History (England since prehistoric times). 3 credits per quarter; no prerequisite. This course is especially recommended for pre-legal students.
- 11f-12w-13s†—Medieval History (300-1560). 3 credits per quarter; no prerequisite. This course is primarily for music and architecture students.
- 14f-15w-16s†—Ancient Civilization. 3 credits per quarter; no prerequisite.

#### HOME ECONOMICS

Courses in home economics are not usually taken by Science, Literature, and the Arts freshmen. Students who are especially interested should inquire in the Junior College office, Room 106 Folwell Hall, as to what courses they may take.

#### HOW TO STUDY

- 1f—How To Study. 2 credits. Registration for this course requires a preliminary conference with the instructor. Students interested should inquire in Room 106 Folwell Hall or in Room 112 Psychology Building. The course has no winter quarter continuation.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

## HUMAN ANATOMY

1f—Elementary Anatomy. 3 credits; no prerequisite. This course is open to beginning freshmen, but those who enter college in the fall are advised not to take it earlier than the spring quarter of their freshman year. It has no winter quarter continuation.

## ITALIAN

1f-2w†-3s—Beginning Italian (1f-2w) and Intermediate Italian (3s). 5 credits per quarter.

## LATIN

1f-2w†-3s—Beginning Latin (1f-2w) and Caesar (3s). 5 credits per quarter.

11f-12w—Vergil. 5 credits per quarter; prerequisite, two years of high school Latin. This course may be followed in the spring by 63s, "Plautus and Terence," 3 credits.

51f-52w-63s—Selected Readings from Prose and Poetry (51f), Horace (52w), Plautus and Terence (63s). 3 credits per quarter; prerequisite, three or four years of high school Latin.

## LIBRARY METHODS

1f—The Use of Books and Libraries. 2 credits; no prerequisite. This course has no winter quarter continuation.

## MATHEMATICS

In each of Courses 1, 6, 8, and 15 a placement test will be given at some time within the first two weeks of the quarter. Any student who fails in the test in Course 1 may be required to drop the course and to review his elementary mathematics before taking college mathematics. Any student who offers less than one year of high school higher algebra as a substitute for Course 1 and who fails the placement test given in Course 6, 8, or 15 will be required to take Course 1 before taking more advanced mathematics. A student who has had a complete year of elementary algebra, and a corresponding course in higher algebra for one-half year, should be able to pass the placement test in Course 6, 8, or 15.

1f-6w-7s—Higher Algebra (1f), Trigonometry (6w), College Algebra (7s). 5 credits per quarter; prerequisite, one year of elementary algebra\* and, for 6w, one year of plane geometry.

1f-8w-20s—Higher Algebra (1f), Commerce Algebra (8w), Mathematics of Investment (20s). 5 credits per quarter; prerequisite, one year of elementary algebra.\* Course 8w-20s is primarily for prebusiness students. See 8f-20w.

1f-15w-16s—Higher Algebra (1f), Elementary Mathematical Analysis (15w-16s). 5 credits per quarter; prerequisite, one year of elementary algebra\* and, for 15w-16s, one year of plane geometry. Course 15w-16s is primarily for pre-medical students. See 15f-16w.

6f-7w-30s—Trigonometry (6f), College Algebra (7w), Analytic Geometry (30s). 5 credits per quarter; prerequisite, plane geometry and high school higher algebra; open for college credit to students who have had high school trigonometry.

\* Course 1 is open for college credit to students who have had, in addition to elementary algebra, not more than one half year of high school higher algebra.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

- 7f—College Algebra. 5 credits. This course is open to freshmen who have had high school trigonometry if approved by the chairman of the department. It may be followed in the winter and spring by 30w, "Analytic Geometry," 5 credits, and 50s, "Differential Calculus," 5 credits.
- 8f-20w—Commerce Algebra (8f), Mathematics of Investment (20w). 5 credits per quarter; prerequisite, high school higher algebra. This course is primarily for prebusiness students, but others may take it. Course 20w may be followed in the spring by 21s, "Introduction to the Mathematics of Life Insurance," 3 credits.
- 15f-16w—Elementary Mathematical Analysis. 5 credits per quarter; prerequisite, plane geometry and high school higher algebra. This course is for premedical and other students who desire a survey of college mathematics including trigonometry, algebra, and calculus with emphasis on fundamental ideas rather than on technical preparation for more advanced courses in mathematics. It is a prerequisite for the course in physics which is required of premedical students.

#### MILITARY SCIENCE AND TACTICS

- 1f-2w-3s—First Year Basic Course. 1 credit per quarter. The Basic Course in Military Science extends through the freshman and sophomore years. There is no prerequisite for the first year's work; but higher algebra (unless the student had it in high school) and trigonometry are prerequisite for the work of the second year. The student should take trigonometry or higher algebra in the fall quarter according as he has or has not had high school higher algebra. Students may register for the Basic Course without these prerequisites and substitute playing in the band for the regular military work, with the understanding that this choice renders them ineligible for the Advanced Course in Military Science.

#### MUSIC

Music courses of general interest are "Music Appreciation" (31f-32w-33s) and, for those who can sing or play an instrument, "Orchestra" (40f-41w-42s) or "University Chorus" (43f-44w-45s).

Music Education 1f—Music Orientation. This is a course, for no college credit, for freshmen who expect to major in music.

1f—Ear Training. 2 credits; prerequisite, a placement test, for which students may make arrangements in the office of the Department of Music. This course may be followed by 2w-3s, "Ear Training," 1 credit per quarter, or by 4w-5s, "Harmony," 3 credits per quarter.

11-27—Practical Music (Piano, Voice, Violin, Viola, Cello, Double Bass, Flute, Oboe, Clarinet, Bassoon, Trumpet, French Horn, Trombone, Tuba, Percussion, Harp, Organ). 2 or 4 credits per quarter according as the student takes one or two lessons a week; prerequisite, certain entrance requirements, which are stated on page 31 of this bulletin, and the consent of the Department of Music. (There are courses in Piano and Voice for those who cannot meet these entrance requirements. See Af-Bw-Cs and Df-Ew-Fs below.) There are special fees for these courses. (See page 4.) Class lessons, which are less expensive, are given in piano and voice.

Af-Bw-Cs—Piano. No credit; for students without the entrance requirements in piano; prerequisite, consent of the Department of Music. There is a special fee for this course. (See page 4.)



- Df-Ew-Fs—Voice. No credit; for students without the entrance requirements in voice; prerequisite, consent of the Department of Music. There is a special fee for this course. (See page 4.)
- 29f—The Physical Basis of Music. 3 credits; no prerequisite. This course may be followed by 30w, "Physics of Tone Color and Tone Production," 3 credits.
- 31f-32w-33s—Music Appreciation. 2 credits per quarter; no prerequisite. This is a course for the cultivation of better understanding of music heard today. It is designed for students with a general interest in music rather than for those majoring in music. Students may enter any quarter.
- 40f-41w-42s—Orchestra. 2 credits per quarter; prerequisite, consent of the director. Students may enter any quarter.
- 43f-44w-45s—University Chorus. 1 credit per quarter; prerequisite, consent of the director. Students may enter any quarter.

## NATURAL SCIENCE

- 1f-2w-3s—Orientation in the Natural Sciences. 5 credits per quarter; no prerequisite. Students may enter any quarter and need not take the whole course to get credit for part of it. This is an introductory course in the natural sciences. The subject matter of the various sciences will be integrated into a survey course with assigned readings, field trips, and demonstration lectures. The entire course (15 credits), but not a 5- or 10-credit part of it, will satisfy the natural science requirement for admission to the Senior College. The individual quarters (1f, 2w, 3s) may be taken as elective courses.

## NAVAL SCIENCE AND NAVIGATION

- Naval Science 1f-2w-3s—First Year Basic Course.  $1\frac{1}{2}$  credits per quarter; prerequisite, consent of the department. NOTE.—All students must be interviewed by a professor of naval science and tactics, given a special physical examination, and selected for the course before registering for Naval Science 1f.
- Navigation 1f-2w-3s—Elementary Navigation and Piloting (1f), Celestial Navigation (2w), Deep Sea and Aerial Navigation (3s). 3 credits per quarter; prerequisite, plane trigonometry.

## NORWEGIAN

- 1f-2w-3s—Beginning Norwegian (1f-2w) and Intermediate Norwegian (3s). 5 credits per quarter; no prerequisite.

## PHILOSOPHY

- 2f-1w-3s—Logic (2f), Problems of Philosophy (1w), Ethics (3s). 5 credits per quarter; no prerequisite. This course is open to all prelegal freshmen and to a limited number of other students whose college aptitude ratings are not too low.

## PHYSICAL EDUCATION FOR MEN\*

- 1f-2w-3s\*—Sports Education. Students may enter any quarter. This course includes instruction and participation in the following activities: swimming, life-saving, boxing, badminton, tennis, and individual physical education activities (by special permission).

\* This college does not require its students to take courses in physical education nor does it give credit for them. They are, however, required for admission to the College of Education; and students who expect to transfer to that college are advised to take them. Men should take Course 1f-2w-3s. Women should take Course 1f-2w-3s and also 7f or 7w or 7s.

## PHYSICAL EDUCATION FOR WOMEN\*

1f-2w-3s\*—A General Course in Physical Education. Students may enter any quarter. The activities which students may choose are *Aquatics*: canoe paddling, swimming, lifesaving. *The Dance*: folk dancing, recreational rhythms, the modern dance, social dancing, tap dancing. *Individual Sports and Activities*: archery, badminton, bowling, golf, horseback riding, individual body building, rifle marksmanship, skating, tennis. *Team Sports and Activities*: baseball, basketball, posture and daily life skills, fundamental sports skills, a spectator's survey of sports and the dance (with movies, demonstrations, and talks by experts on sports and the dance), volleyball.

7f—Lectures in Health and Physical Education. This course is offered also in the winter (7w) and in the spring (7s).

## PHYSICS

Courses in physics for premedical students and for those who will major in physics, mathematics, or chemistry are not open to beginning freshmen, since college mathematics (Course 15-16 or equivalent) is a prerequisite.

1f-2w†-3s—Introduction to Physical Science (without laboratory). 3 credits per quarter; prerequisite, high school algebra and plane geometry. This course is for students who want a general course in physics as a part of a liberal education. If taken with laboratory (see below), it satisfies the natural science requirement in this college. It is not for premedical students or for those who will major in physics, mathematics, or chemistry. It is required of premedical and medical technology students but is usually taken by them in their sophomore year. The same course with laboratory included is listed as 1af-2aw-3as.

1af-2aw†-3as—Introduction to Physical Science (with laboratory included). 4 credits per quarter; prerequisite, high school algebra and plane geometry. See 1f-2w-3s.

## PHYSIOLOGY

1f—Elements of Physiological Chemistry. 4 credits; no prerequisite. This course is open to beginning freshmen, but those who enter college in the fall are advised not to take it earlier than the spring quarter of their freshman year. It has no winter quarter continuation.

2f—Elements of Physiology. 4 credits; no prerequisite. This course is open to beginning freshmen, but those who enter college in the fall are advised not to take it earlier than the spring quarter of their freshman year. It has no winter quarter continuation.

## POLITICAL SCIENCE

Af-Bw-Cs†—Introduction to Government. 3 credits per quarter; for prelegal students only; no prerequisite.

1f-2w†-3s—American Government and Politics. 3 credits per quarter; for all except prelegal students; no prerequisite.

## PREVENTIVE MEDICINE

3f—Personal Health. .2 credits; no prerequisite. This course may be followed in the winter (or spring) by 4w (or 4s), "Health Problems of Adult Life," 2 credits.

\* This college does not require its students to take courses in physical education nor does it give credit for them. They are, however, required for admission to the College of Education; and students who expect to transfer to that college are advised to take them. Men should take Course 1f-2w-3s. Women should take Course 1f-2w-3s and also 7f or 7w or 7s.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

## SOCIOLOGY

The first course in sociology (Course 1, "Introduction to Sociology," 5 credits) is not open to beginning freshmen but is regularly open to third quarter freshmen, many of whom can find a place for it on their spring quarter programs. By special permission a limited number of freshmen who enter college in the fall will be allowed to take sociology in the winter.

## SPANISH

1f-2w-3s—Beginning Spanish (1f-2w) and the first part of Intermediate Spanish (3s). 5 credits per quarter.

2f-3w-4s—The second part of Beginning Spanish (2f) and Intermediate Spanish (3w-4s). 5 credits per quarter; prerequisite, one year of high school Spanish.

3f-4w—Intermediate Spanish. 5 credits per quarter; prerequisite, two years of high school Spanish. This course may be followed in the spring by 30s, "Spanish Commercial Correspondence," 3 credits.

## SPEECH

The beginning course, "Fundamentals of Speech," which is offered as 1f-2w-3s† (3 credits per quarter) or 5f-6w† (5 credits per quarter), is open to those freshmen who are exempt from required English. (See Regulations applying to Freshman English, page 12.) Other freshmen may take Speech only by special permission of the department.

## SWEDISH

7f-8w-9s—Beginning Swedish (7f-8w) and Intermediate Swedish (9s). 5 credits per quarter; no prerequisite.

## VOCATIONAL ORIENTATION

1f—Vocational Orientation. 2 credits; no prerequisite. This course is an introduction to the University of Minnesota agencies which help students make educational and vocational plans. There will be discussions and lectures about the best methods of making choices. Some of the lectures will be illustrated by motion pictures. There will be opportunities for students to hear speakers from different university departments and community business organizations and to have individual conferences with instructors and counselors. The course has no winter quarter continuation.

## ZOOLOGY

1f-2w-3s†—General Zoology. 3½ credits per quarter; no prerequisite.

## FRESHMAN COURSES WHICH BEGIN IN THE WINTER QUARTER\*

Architecture DP-1w and M-1w; Art Education 4w-6s; Botany 1w; Chemistry 9w-10s; Drawing 41w-42s and 44w; Economics 1w-3s; English 4w-5s and Aw-Bs; English 27w-28s, 22w-23s, and 38w-39s, for students exempt from Freshman English; Fine Arts 2w-3s; French 1w-2s, 2w-3s, 3w-4s; Geology 1w-2s, Aw-Bs, 1w-3s, Aw-Cs, and 8s; German 1w-2s, 2w-3s, 3w-4s; History 1w-2s; Home Economics; How To Study 1w; Latin 12w, for students who have had three years of high school Latin; Library Methods 1w; Mathematics 1w-6s, 1w-8s, 6w-7s, 7w-30s,

\* For titles, credits per quarter, prerequisites, and other information about these courses, students should refer to the courses with the same numbers in the preceding list of freshman courses which begin in the fall quarter.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

8w-20s, 15w-16s; Military Science 2w (for which 1f is not a prerequisite); Music 1w, 32w-33s, Courses 11-27 (Practical Music), 41w-42s, 44w-45s; Natural Science 2w-3s; Philosophy 2w-1s; Physical Education for Men 2w-3s; Physical Education for Women 2w-3s and 7w; Political Science 1w-2s; Preventive Medicine and Public Health 3w; Spanish 1w-2s, 2w-3s, 3w-4s; Speech 1w-2s and 5w-6s, for students exempt from Freshman English; Vocational Orientation 1w.

#### FRESHMAN COURSES WHICH BEGIN IN THE SPRING QUARTER\*

Architecture DP-Is and M-Is; Art Education 4s; Botany 1s; English 4s; English 27s, 23s, and 39s, for students exempt from Freshman English; Fine Arts 3s; French 1s, 2s, 3s; Geology 1s, As, and 8s; German 1s, 2s, and 3s; Home Economics; How To Study 1s; Human Anatomy 3s; Latin 3s, for students who have had one year of high school Latin; Library Methods 1s; Mathematics 1s, 6s, 7s, and 8s; Military Science 3s (for which 1f-2w is not a prerequisite); Music 33s, Courses 11-27 (Practical Music), 42s and 45s; Natural Science 3s; Navigation 1s; Philosophy 2s; Physical Education for Men 3s; Physical Education for Women 3s and 7s; Physiology 1s and 2s; Preventive Medicine and Public Health 3s; Spanish 1s, 2s, 3s; Speech 5s, for students exempt from Freshman English; Vocational Orientation 1s.

#### ADVISERS

Every freshman may have a faculty counselor to whom he can go for help in personal matters, in choosing a vocation, or in planning his study program. This counselor will put the student in touch with specialists in fields in which he may be interested and will arrange for special tests or other sources of information. For this service the student should go to Room 114, Psychology Building.

Each freshman student who has not decided on the general plan of his college course before entrance should begin at once to consider whether he will elect a major study or the curriculum in liberal arts (pages 23-34) or one of the professional courses—library training, social work, medicine, etc. (pages 34-53). He should seek the help of one of the faculty counselors who are appointed to deal with freshman problems. As soon as he has decided on a four-year course in this college, he will be assigned to an adviser who will assist him throughout the four years. In case a student changes his choice of a field of work he will be transferred to an adviser in the new field.

Every student is expected to make the planning of his study program a serious part of his work. The student should plan his program and bring it to his adviser for suggestions and approval. Advisers are available for discussion of student programs at any time during the year.

Freshmen or sophomores who do not have regular counselors should discuss their study programs with the assistant dean for the Junior College, Room 106, Folwell Hall, or with Senior College advisers in lines of work in which they are interested.

\* For titles, credits per quarter, prerequisites, and other information about these courses, students should refer to the courses with the same numbers in the preceding list of freshman courses which begin in the fall quarter.

## I. THE COURSE LEADING TO THE DEGREE OF BACHELOR OF ARTS\*

This is the regular curriculum offered for those who want a four-year college course leading to the bachelor of arts degree. The requirements to be met in the Junior College and in the Senior College are stated separately and at length in the following paragraphs. A brief summary is given first for the convenience of students, but they should not take that as fully explanatory. They *must read* the subsequent paragraphs if they are to understand the requirements.

### SUMMARY

The Junior College requirements for admission to the Senior College are as follows:

1. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
2. Foreign language, 0 to 20 credits according to a schedule given in a subsequent paragraph.
3. Ten credits<sup>†</sup> in one of the social studies.
4. Ten credits<sup>†</sup> in one of the natural sciences or 15 credits in Natural Science 1f-2w-3s, "Orientation in the Natural Sciences."
5. A total of at least 90 credits, with an average of one honor point per credit.

The Senior College requirements for graduation are normally as follows:

1. A total of 90 credits, to be earned in Senior College courses except as the student's adviser approves more Junior College courses. Subsequent paragraphs tell how the required number may be less than 90 for students who enter the Senior College with more credits than are required for admission.
2. An average of one honor point per credit.
3. (a) A departmental major (27 to 36 credits in Senior College courses), and one minor sequence of 15 credits or two minors of 9 credits each  
or  
(b) An approved "liberal arts" program, with less specialization.

The general purpose of the curriculum is to enable capable students to attain the ends of higher liberal education, allowing each one to do the work best suited to develop his powers and to satisfy his interests. Faculty advice is offered to each student in planning this course.

Two general plans of study are offered, one providing for concentration, the other offering opportunity for greater breadth of training. The first plan is the traditional one, involving the pursuit of major and minor studies in the Senior College. The second is a curriculum in liberal arts<sup>‡</sup> intended for those who wish to get a broader view of the fields of knowledge or to draw upon a wider range of studies in preparing themselves for life. Graduation honors are open to candidates for the B.A. degree on either plan.

The requirements of a course include the selection of studies according to certain principles and a certain quality in the student's work. For convenience these requirements are stated concretely in terms of time, credits, and grades. Students should understand that the time spent and the credits entered on the books are not the real object but only symbols used in keeping the records.

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

† Or 9 credits in a year course or 9 credits (6 semester credits) of advanced standing.

‡ See page 26; for a Special Course in the Humanities, see page 28; and for a Course in Preparation for Theological Training, see page 27.

## JUNIOR COLLEGE

The purpose of the specific requirements stated is to prepare for satisfactory work in the Senior College those who are candidates for the B.A. degree. A student will be admitted to the Senior College on the completion of the following work or the equivalent in another recognized institution.

*Required Courses and Distribution of Work*

1. In four groups of subjects there are specific requirements as follows:
  - a. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. All students are required to take a placement test before registering for any course in English or composition. (See page 12.)
  - b. Foreign language, 0 to 20 credits, according to the following schedule:†
 

<i>Amount Presented for Entrance</i>	<i>Amount Required in Junior College</i>
Four years of one language	None
Three years of one language	5 credits in same language
Two years of one language	10 credits in same language
One year of one language	15 credits in same language
Less than a year of one language	20 credits in one language
  - c. 10 credits\* in one of the social studies: anthropology, economics, geography, history, political science, sociology.
  - d. 10 credits\* in one of the natural sciences: astronomy, botany, chemistry, geology (including laboratory), physics (including laboratory), psychology (including laboratory), zoology.  
or  
15 credits in Natural Science 1f-2w-3s, "Orientation in the Natural Sciences."§

Freshmen may take any of the "Studies for Freshmen" listed on page 13 except courses which are specifically announced as limited to special groups of students; but they are advised to have these group requirements in mind when they are planning their programs.

In addition to these specified studies the student will take studies chosen by himself (electives) to make up the number of credits required. (See the following paragraphs.)

2. In order that the student may be prepared on entering the Senior College to devote his time to Senior College studies, he should examine the prerequisites for the Senior College courses in the fields in which he is interested. By the end of his sophomore year he is expected to be prepared for Senior College studies in at least five departments. The amount of such preparation necessary in the different departments is indicated below:

Anthropology (10 credits)	English Composition—Course A-B-C (Freshman English) or Course 4-5-6 (Freshman Composition), and Course 27-28 (Advanced Writing)
Architecture (10 credits)	English Literature—Course A-B-C (Freshman English); or Composition 4-5-6 (Freshman Composition) and 6 additional credits in literature; or 10 credits in Course 21-22-23 (Introduction to Literature)
Astronomy—Astronomy 11 (Descriptive Astronomy and Mathematics 6 (Trigonometry))	
Botany (10 credits)	
Chemistry—through Course 12-13 (Qualitative Chemical Analysis)	
Economics—Course 6-7 (Principles of Economics)	

\* Or 9 credits in a year course or 9 credits (6 semester credits) of advanced standing.

† For students who enter this University with advanced standing, the number of credits required may be less than that indicated in this schedule. Any course of 9 credits (6 semester credits) may be substituted for the corresponding 10-credit course here.

§ This is a new course which will be offered for the first time in 1941-42. To meet the natural science requirement for admission to the Senior College, the whole course must be taken. A 10-credit part of it is not enough. The individual parts (1f, 2w, 3s) may be taken separately as electives.

Fine Arts (9 credits)	Music (10 credits)
French—through Course 3-4 (Intermediate French)	Norwegian—through Course 4-5-6 (Advanced Norwegian)
Geography (10 credits)	Philosophy (10 credits)
Geology (10 credits, including 4 credits in laboratory)	Physics—Course 1a-2a-3a or 4-5-6 or 7-8-9
German—through Course 4 (Intermediate German)	Political Science (9 credits)
Greek—Courses 1-2, 3 (15 credits)	Psychology (9 credits)
History (9 credits)	Sociology (10 credits)
Italian—Courses 1-2, 3 (15 credits)	Spanish—through Course 3-4 (Intermediate Spanish)
Journalism—Courses 13, 14-15 (Introduction to Reporting, Newspaper Reporting)	Speech (9 credits)
Latin—through Course 12 (Vergil)	Swedish—through Course 10-11-12 (Advanced Swedish)
Mathematics—through Course 30 (Analytic Geometry)	Zoology (10 credits)

3. If the student elects the curriculum for concentration he must plan to secure the necessary preparation for a major sequence in consultation with a major adviser. He should apply at the departmental office and be assigned to a major adviser. If he chooses the curriculum in liberal arts he should elect elementary courses in those departments in which he wishes to do advanced work in his junior and senior years. He should apply to the Senior College office (217 Folwell Hall) for assignment to an adviser.

The choice between the curriculum for concentration and the curriculum in liberal arts should be made by the student not later than the end of his sophomore year. He is at liberty to consult with Senior College advisers at any time that he desires and will be assigned to an adviser whenever he has chosen his course.

#### *Amount and Quality of Work*

The student must earn a total of 90 credits, with an average of one honor point per credit, or a smaller number of credits determined as follows: For every five honor points in excess of one honor point per credit, the number 90 is diminished by one. (Credits thus earned by excess honor points are called "quality credits." See paragraphs 33, 34, 35 on page 6.)

A student entering with advanced standing from some other institution must complete the same requirements. He must secure an average of one honor point per credit for work done in this University. Quality credits can be earned only in connection with the work done in this University.

While the quality of work normally expected is expressed by an average of one honor point per credit, improvement in the quality of the work as the student progresses will be taken into account by the Students' Work Committee. If improvement and other considerations are accepted in part as the basis of promotion, the average of one honor point per credit will be required in the last 45 credits. Students who wish to enter the Senior College on these terms should apply to the Senior College office, 217 Folwell Hall.

While the normal time of residence in the Junior College is two years, this may be shortened by the application of quality credits, or it may be necessary for the student to spend a longer time in order to demonstrate ability to do work of the quality expected. *The student is expected to enter the Senior College as soon as he has completed the preparation required.* Students should apply for admission to the Senior College as soon as they have the required 90 credits and a C average even if they have not met all the group requirements (English, foreign language, one of the social studies, one of the natural sciences). They may be admitted provisionally. Credits earned in the Junior College *after the student is*

qualified to enter the Senior College may not ordinarily be counted to meet the requirements of the Senior College. Extra credits in Senior College courses may be counted toward meeting the Senior College requirements for graduation. *Extra credits in Junior College courses may be counted only with the approval of the Students' Work Committee.*

#### SENIOR COLLEGE

The student is expected to devote his time to Senior College studies except in so far as, in the judgment of his Senior College adviser, additional elementary studies definitely contribute to his intellectual development.

The normal period of residence is six quarters and the normal credit requirement is 90 credits. The student must maintain an average of one honor point per credit in the work done while in residence in the Senior College. The number of credits may be diminished and the period of residence shortened by application of quality credits\* earned in Senior College courses during residence in the Senior College.

#### *Requirements in the Curriculum for Concentration*

1. Each student electing this curriculum must complete a coherent and progressive sequence of Senior College courses, known as a major sequence, as specified by the department which offers it. Such major sequences are offered by the following departments: Anthropology, Architecture, Astronomy, Bacteriology, Biostatistics, Botany, Chemistry, Classics, Economics, English, Fine Arts, Geography, Geology and Mineralogy, German, History, Journalism, Linguistics and Comparative Philology, Mathematics, Music, Philosophy, Physics, Physiology, Political Science, Psychology, Romance Languages§, Sociology and Social Work¶, Speech, Zoology. The courses constituting a major sequence in any department are announced in the University's *Combined Class Schedule*. The major sequences in Journalism and Music are also announced in this bulletin, on pages 28 and 31.

A student must maintain an average of one honor point per credit in the work of the major sequence.

2. A minor sequence of 15 credits, or two minors of 9 credits each, in Senior College courses. These must be taken in some department or departments other than the student's major department and in addition to his major sequence.

3. The whole plan of studies in the Senior College must receive the approval of the major adviser.

#### *Requirements in the Curriculum in Liberal Arts*

Each student who wishes to elect this curriculum must submit to the assistant dean for the Senior College a plan of study in which the subjects and courses chosen are related to one another and to the student's purpose and are intelligently arranged in a working program. If this plan gives evidence of a central purpose, the student will then be assigned to an adviser who will examine and discuss the plan with him. The program as approved by the adviser is to be carried out in harmony with the general requirements.

\* For a definition of quality credits, see paragraph 33 on page 6.

§ An interdepartmental sequence in Latin-American studies is offered under the direction of the Department of Romance Languages. See page 30 of this bulletin.

¶ For an interdepartmental sequence recommended as preparation for graduate social work, see page 35 of this bulletin.



An indefinite variety of study programs† may be recognized under this heading. They may serve the purpose of the student who is interested in general culture, in literary or artistic pursuits, in comparative literature, in the integration of fields of study ordinarily separated by departmental organization, in critical interpretation, or in any activity, preparation for which requires the student to draw upon several fields. This curriculum is intended to provide for the making of programs by individuals to suit their own interests or needs.

In conference with his adviser, the student will work out a program for his Senior College years. When this program has been approved by the adviser and the assistant dean, it becomes a contract between the college and the student, and no change in it may be made without the written permission of the adviser. The adviser represents the college in approving the individual's program.

#### *Requirements for Graduation*

For graduation a student must satisfy all specific requirements stated above.

It is ordinarily expected that a student who enters as a freshman will spend four years (twelve quarters) in residence in the college. The period of residence may be shortened by the application of quality credits or by taking examinations for credit (see paragraphs 7, 8 on page 3). If a student has transferred from some other college he must spend the last three quarters before graduation in residence in the Senior College and must earn a minimum of 45 credits in residence in the Senior College.

The credit requirement for graduation is: 180 credits with an average of one honor point per credit, or a smaller number of credits as provided in the above rules governing the Junior College and the Senior College, respectively.

#### *Preparation for Theological Training*

The attention of students intending to enter theological seminaries or to take other special training for religious work is drawn to the following liberal arts major:

1. Philosophy 50-51-52. General History of Philosophy (9 credits).
2. Nine credits from these courses in philosophy:
  - 106-107. Philosophy of Plato (6 credits)
  - 114. American Philosophy from Puritanism to Pragmatism (3 credits)
  - 180. History of Religions (3 credits)
  - 181. Psychology of Religion (3 credits)
  - 182. Philosophy of Religion (3 credits)
3. Nine credits from these courses in history:
  - 53-54-55. Medieval European History (9 credits)
  - 53a-54a-55a. Renaissance and Reformation (9 credits)
4. Eighteen credits from the following group: 9 credits in Senior College Greek; 9 credits in Senior College psychology; 9 credits in Senior College economics; 9 credits in Senior College sociology, including Sociology 115 (Religion As a Social Institution).
5. Fifteen additional Senior College credits, making a total of 60 credits in Senior College courses.

Students interested in this program may consult with Mr. Conger or Mr. Castell, in Room 300 Folwell Hall.

† The Senior College courses in this approved program are said to constitute a "liberal arts major." Two such majors are outlined in subsequent paragraphs, under the headings "Preparation for Theological Training" and "A Special Course in the Humanities."

*Special Course in the Humanities*

The Course in the Humanities has been planned for selected students to enable them to acquire, through the systematic co-ordination of history, philosophy, the fine arts, music, the ancient and modern languages, a well-ordered knowledge of our cultural development. It is by the study of the relationship between habits of thought, historical events, and the cultural expression of past civilizations that one may determine accurately the causes and meanings of past events and also gain help in facing and solving the problems of contemporary life. The course is so arranged that a student, starting with the facts of history as a basis, may study critically in historical sequence the great monuments of creative energy and may thus acquire a precision of method and thought no less exact or useful than that of the natural and physical sciences.

Admission to the Course in the Humanities is limited to students who, in the judgment of the committee in charge, are properly qualified. The greatest possible freedom for the student is desired, and the course is planned so that it will adapt itself to the needs and preferences of the individual. The work of a student, after admission to the course, will be supervised by an adviser and a committee made up of members of the departments concerned.

No prerequisites are necessary for admission to the Course in the Humanities. It is, however, strongly recommended that the student who plans to enroll in it have, while in high school, two or more years of a foreign language and the basic courses in history and literature. Upon the completion of such preparatory work the student is free to study more varied and more advanced subjects earlier in his college career.

The general requirements for admission to the Senior College and for graduation are the same as in the Curriculum in Liberal Arts. (See page 26.) The specific requirements for the course are as follows:

1. Two years of Senior College work in one foreign language.
2. A reading knowledge, attainment of which may be determined by examination, of at least one other foreign language.
3. Concentration on one of the four great periods of culture, Ancient, Medieval, Renaissance, or Modern. The courses in literature, history, fine arts, philosophy, and other expressions of one of these periods are to be chosen so as to complement each other. At least 90 credits are to be taken in the field of concentration, of which at least 60 credits must be in Senior College courses.
4. Electives to make up the remainder of 180 credits may be chosen according to the student's wishes, provided the requirements of his curriculum are fulfilled. It is advised, however, that the electives be chosen from contiguous fields.

Various suggested programs for the four-year course may be had on application to Professor Ogle, 118 Folwell Hall.

*A Course in Journalism†*

**Advisers.**—Professors Casey, Charnley, Barnhart, and Nafziger; Assistant Professors Ford and Kildow.

Professional training for journalism is provided by a major in the School of Journalism leading to the degree of bachelor of arts, for which the requirements are given on pages 23-27. The course is built upon the principle that a well-trained journalist must possess a broad cultural training, a prerequisite to successful jour-

† For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

nalistic work, plus a sound working knowledge of the theory and technique of his profession.

The student's distinctly journalistic training begins in his sophomore year with a course in reporting, which he may enter if he has satisfied the scholastic requirements of the department.

No student may enroll in sophomore journalism courses unless he has an average of C in the total courses taken in his freshman year and a similar average in the required freshman work in English. Exceptions to this rule can be made only under unusual circumstances and then only by permission of the Students' Work Committee on recommendation of the chairman of the School of Journalism.

The student begins the Senior College major sequence in journalism after satisfying the usual requirements for admission to the Senior College described on pages 23-26. Altho a student may meet these requirements in his own way, the School of Journalism recommends the following courses of study for the freshman and sophomore years:

1. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits), or exemption from the requirement. (See page 12.)
2. French, German, or Spanish to meet the foreign language requirement.
3. Economics or history or political science or sociology, to meet the social studies requirement.
4. Natural Science 1-2-3 "Orientation in the Natural Sciences," or psychology (with laboratory), or zoology, to meet the natural science requirement.
5. Advanced Writing (Composition 27-28); Introduction to Reporting (Journalism 13); and Newspaper Reporting (Journalism 14-15); which are prerequisites for the Senior College major sequence in journalism.
6. Electives to make the required total of 90 credits.

Recommended electives are: Political Science 1-2-3 (American Government and Politics); Political Science 7 (Comparative European Government); Political Science 25 (World Politics); Psychology 1-2 (General Psychology); Sociology 1 (Introduction to Sociology); Sociology 6 (Social Interaction); Economics 6-7 (Principles of Economics); at least nine credits in history.

The Senior College curriculum is arranged to offer training for metropolitan journalism, small daily or weekly journalism, including newspaper advertising and business management aspects of the publishing industry, magazine writing and editing, advertising, and public relations work, radio writing; and, in co-operation with the College of Education, for teaching journalistic writing and supervising student publications in high schools and junior colleges.

When students enter the Senior College they are advised to select their elective work for preparation in special fields. Editorial courses are designed to train students in news gathering, writing and editing, feature and magazine writing, newspaper administration, magazine editing and administration, and radio writing. Business courses train them in newspaper and periodical advertising, circulation problems, and business management methods. Students electing business sequences may take minor work in advertising and marketing in the School of Business Administration, together with a course in the psychology of advertising.

The major sequence in journalism in the Senior College is as follows: Course 51-52 (News Editing) (51 for women; 51-52 for men); Course 55 (Advertising and Newspaper Typography); Course 69 (Newspaper and Magazine Articles) or Course 73-74 (Magazine Writing and Editing); Course 101 (The Reporting of Public Affairs) (for men); Course 109-110 (History of Journalism); Course 140-141-142 (Contemporary Affairs); and 9 additional credits to be chosen in conference with the major adviser. Students of marked ability may substitute for

these 9 additional credits in journalism Senior College courses in other departments with the approval of the major adviser in journalism. Women students who do not elect Courses 52 and 101 must substitute other journalism courses of equivalent hours.

The school offers a minor sequence for students in the College of Agriculture, Forestry, and Home Economics, the Institute of Technology, and the School of Business Administration.

A minor sequence for students in the College of Education provides training for those who wish to enter teaching.

#### *A Course in Latin-American Studies\**

**Adviser.**—Associate Professor LeFort.

This course in specialization in Latin-American studies brings together into one group the courses in various aspects of Latin-American life and culture offered by different departments. It includes courses in anthropology, economics, fine arts, geography, history, and Spanish.

The student will receive a thoro cultural training as well as a broad preparation for business or, if he elects enough courses in political science, for diplomatic dealings with Latin-American countries.

The work of the first two years, taken in the Junior College, consists of the regular academic requirements for admission to the Senior College, as given on pages 23-26, with electives chosen to include the following courses as preparation for Senior College work: Anthropology 41 (Introduction to Anthropology) or 42 (The Growth of Cultures); Economics 6-7 (Principles of Economics); Fine Arts 1-2-3 (Introduction to Art); Geography, 8 credits; Spanish 1-2 (Beginning Spanish) and 3-4 (Intermediate Spanish).

Recommended electives are: History 1-2-3 (European Civilization); History 20-21-22 (American History); Political Science 1-2-3 (American Government and Politics); Political Science 25 (World Politics).

The work of the junior and senior years is subject to the requirements of the course leading to the degree of bachelor of arts which are given under the headings *Senior College* (page 26) and *Requirements for Graduation* (page 27) with this exception:

The requirements of a major sequence and one or two minors (page 26) are replaced by the following interdepartmental sequence:

1. Anthropology 118. Indian Civilizations of Mexico and Peru (3 credits).
2. Economics. 141. Monetary and Banking Policy (3 credits).
3. Economics 176. International Commercial Policies (3 credits).
4. Economics 127. Comparative Banking: South American Systems (3 credits).
5. Fine Arts 57-58-59. Art in the Americas (9 credits).
6. Geography 110. Geography of South America (3 credits)
7. History 93a-94a-95a. Survey of Latin-American History (9 credits).
8. Spanish 74-75-76. Survey of Spanish American Literature: Contemporary Prose and Poetry (9 credits).
9. Spanish 70-71. Latin-American Culture (6 credits).
10. Spanish 53. Spanish Composition (3 credits).
11. Spanish 54-55. Spanish Conversation (6 credits).

Recommended electives are: Anthropology 80 (The American Indian); Economics 124 (Comparative Banking: British Systems); Economics B. A. 177 (Foreign Trade); Economics 185 (Economics of Marketing); Geography 71

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

(Geography of North America); History 65-66-67 (Europe in the Twentieth Century); Spanish 140-141-142 (Contemporary Latin-American Literature).

Modifications of this interdepartmental sequence will be permitted upon petition approved by the adviser and the assistant dean for the Senior College.

#### *A Course in Music\**

**Advisers.**—Professor Scott; Associate Professor Hull.

To secure the degree of bachelor of arts with a major in music a student must fulfill the requirements of both the Junior and Senior Colleges as stated on pages 23-27 of this bulletin. He must secure 144 credits in courses other than practical music (piano, voice, etc.). During the first two years, he should register for English A-B-C (Freshman English) or English 4-5-6 (Freshman Composition), unless exempt from the requirements in English (see page 12); foreign language (0 to 20 credits, as indicated on page 24); History 11-12-13 (Medieval History); Psychology 1-2 (General Psychology) and Psychology 4-5 (Introductory Laboratory Psychology); and the following courses in music: 1, 2, 3 (Ear Training); 4-5-6 (Harmony); 7-8 (Counterpoint); 34-35-36 (History of Music). At the end of the sophomore year he must take a comprehensive examination to insure that he is prepared for Senior College work. In the following two years he must complete one or two academic minors (see page 26), and earn from 27 to 30 credits in fields emphasizing one of the following branches of music: composition; history; normal piano (a training course in piano teaching). During the four years he must earn 30 credits in practical music. Special fees for courses in practical music are announced on page 4.

Entrance requirements, according to the instrument selected.—

**Piano:** Any major or minor scale in octaves, thirds, sixths, or tenths, M.M., quarter notes = 108; Bach Invention or dance from one of the suites; a sonata by Haydn or Mozart; a modern composition of equal difficulty with the sonata.

**Voice:** Sing on pitch with correct phrasing and musical intelligence standard songs in good English (the simpler classics recommended). Demonstrate ability to read a simple song at sight and have a knowledge of the rudiments of music. Have a promising voice. Some knowledge of piano is urgently recommended.

**Violin:** Major and minor scales, arpeggios; the simpler Kreutzer Etudes; a sonata by Handel, Haydn, Mozart, or Schubert; a more modern work displaying special technique peculiar to the violin.

**Organ:** Same as for piano.

A student wishing to register in the music course must first pass an examination in practical music before a committee of the faculty of the Music Department. This applies also to academic students who wish to elect courses in practical music.

For more specific information as to required courses, consult the statement of the Department of Music in the University's *Combined Class Schedule*.

For a course in music education leading to the degree of bachelor of science in education and a teacher's certificate, see the Bulletin of the College of Education.

#### HONORS COURSE PLAN

A student who has met all the requirements for admission to the Senior College may be enrolled for the Honors Course upon the approval of the department in which he wishes to pursue his major study.

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

Each student enrolled in the Honors Course will be put under the immediate direction of a member of his major department of professorial rank who shall be known as his tutor.

A part of the student's Senior College work will consist of reading or other individual studies done under the direction of his tutor. Work done in this way will be accepted as a substitute for a part or the whole of the major sequence and of the elective work of the usual curriculum.

A student electing this plan will be governed by the announcement of his major department and the direction of his tutor as to number of courses, attendance at classes, and general methods to be pursued.

The requirements for minor studies are not modified by this plan at present.

When the tutors of a department report at the end of any quarter that a student is not making satisfactory progress in the Honors Course, the student will be registered as a candidate in the regular course. In this case the tutors will report blanket credits equivalent to the work actually done. The student can then arrange to complete his major sequence either in the same department or in another.

For the year 1941-42 Honors Courses are offered by the Departments of Anthropology, Economics, English, Fine Arts, French, Latin, Political Science, Psychology, Sociology and Social Work, and Zoology.

#### GRADUATION HONORS

The degree B.A. may be awarded *cum laude*, *magna cum laude*, or *summa cum laude* upon the recommendation of the Committee on Honors.

Honors are awarded only to students who have a scholastic record of two honor points per credit in all work carried. A student who has this record will be awarded the degree B.A. *cum laude*.

Students who enter with advanced standing are eligible to become candidates for honors if they will have earned 75 credits of work in residence before graduation.

Students wishing to become candidates for the higher honors (*magna cum laude*, *summa cum laude*) must signify their intention not later than the beginning of the third quarter before graduation. Students are admitted as candidates upon the recommendation of the Senior College adviser with the approval of the Committee on Honors. The committee will not admit as a candidate a student who has limited his Senior College work to the minimum requirements in major and minor subjects.

With the approval of the Committee on Honors the candidate may pursue a course of reading in lieu of any or all elective courses. Near the close of the senior year the candidate will take a special examination which may touch upon any part of the field of his college course. In this comprehensive examination the candidate should show (a) an acquaintance with the chief literature and sources of information in the fields studied, and (b) ability to discuss, with intelligence and clear reasoning, questions or problems upon which he has had opportunity to secure the necessary information. Such questions may be new to the student. The object is to test the student's ability to bring facts and theories to bear upon problems presented in the examination. The examination should be a test not of memory but of assimilation, of culture, and of power to command or use the knowledge which courses of study have put within the student's reach. Candidates who pass this examination will, upon recommendation of the committee, be awarded the degree B.A. *magna cum laude*.

A candidate whose standing in the comprehensive examination is satisfactory

and who in addition presents an acceptable critical paper, a piece of creative work, or a thesis embodying the results of original research will, upon recommendation of the committee, be awarded the degree of B.A. *summa cum laude*. The preparation of the paper should be begun early in the senior year. All theses must be prepared in triplicate and turned in at the Senior College office not later than six weeks before graduation; for those graduating at the close of the spring quarter not later than May 1.

The degree of B.S. *cum laude* will be awarded to students who have an average of two honor points per credit in all their work.

Students may be accepted as candidates for the higher honors in courses leading to the B.S. degree and in combined arts and professional courses provided they present an equivalent of the work required for graduation honors in the general course leading to the B.A. degree.

#### COURSES IN THE GENERAL EXTENSION DIVISION

A student who takes courses in the General Extension Division in classes in St. Paul, Minneapolis, or Duluth and wishes to count them toward a Bachelor's degree given by the College of Science, Literature, and the Arts must meet all curricular requirements of this college as stated in the bulletin. This means that:

- a. Before beginning work in the Senior College with a view to graduation, the student shall apply for Senior College standing and be enrolled by the assistant dean for the Senior College.
- b. He shall be assigned to a Senior College adviser and shall complete all the Senior College studies under the direction of the adviser.
- c. He shall complete any required work, either of major or minor sequences or of any other nature, in this college if it is not offered in the General Extension Division.
- d. He must observe any specific requirements which may be adopted hereafter, such as comprehensive examinations on either Junior College or Senior College work.

For the adjustment of irregularities in his curriculum the student will get advice from the assistant dean for the Senior College or from his major adviser.

A student who does not conform to these regulations may apply for standing in the Senior College on the same terms as a student transferred from some other institution.

Students who have not taken class work in one of the cities named must meet both curricular and residence requirements.

#### CREDIT IN THE GRADUATE SCHOOL

A student lacking not more than nine credits toward graduation may, upon petition, receive graduate credit for a limited amount of work taken as an undergraduate. No graduate credit will be given unless the student has made previous arrangements with the Graduate School. Courses taken for graduate credit will not carry credit toward the Bachelor's degree.

With the permission of the assistant dean for the Senior College, undergraduates lacking not more than nine credits toward graduation may be registered also in the Graduate School. Permission will be granted only in exceptional cases.

## II. A COURSE IN LIBRARY TRAINING\*

For the course in library training, leading to the degree of bachelor of science in the College of Science, Literature, and the Arts, a student must first complete satisfactorily three years of academic work. During his third year the student will elect work in this college, subject to the approval of the assistant dean for the Senior College. During these three years the student must secure at least 135 credits, and an average of one honor point per credit for all credits earned. (This number of credits required may be reduced by application of the "quality credit" rules given in paragraphs 33, 34, 35 on page 6.) At least 30 credits must be in Senior College courses. The student must complete the requirements for admission to the Senior College, given on pages 23-26, and is subject to all the regulations which govern the work of other Arts students. He must complete his academic requirements before beginning the courses in Library Instruction.

*For admission to the fourth year of this course the student must secure the written approval of the assistant dean for the Senior College of the College of Science, Literature, and the Arts.*

During the fourth year a student will elect not less than 45 credits from courses given by the Division of Library Instruction, and must maintain an average of one honor point per credit for all the credits earned.

*Training for Hospital Librarianship*

Candidates for admission to this special course must have completed satisfactorily (1) at least three years of approved college work and at least two quarters of work in an approved library school or an equivalent of approved experience in hospital library work, and (2) the following courses or their equivalents: Preventive Medicine and Public Health 50 (Public and Personal Health, 3 credits); Psychology 1-2 (General Psychology, 6 credits); Psychology 144-145 (Abnormal Psychology, 6 credits); Sociology 1 (Introduction to Sociology, 5 credits); Sociology 49 (Social Pathology, 3 credits); Sociology 90 (Survey of Social Work, 5 credits); Zoology 1-2-3 (General Zoology, 10 credits). Students are not permitted to register for less than the four courses in hospital librarianship, and no candidate for a certificate or degree will be excused from Hospital Library Practice. Opportunity for individual study of problems of special interest will be given as far as practicable. All prospective students who have not taken their preliminary work at the University of Minnesota must apply for admission to this University and must submit their credentials to the registrar of the University of Minnesota, Minneapolis, Minnesota. Since each application requires special consideration, early application is extremely desirable. It is expected that only those who are genuinely interested in work in hospitals, are physically able to do such work, are willing to accept positions in them, and have personal and educational qualifications for such will apply.

For admission to the Division of Library Instruction and to the course in Hospital Librarianship a special certificate must be secured from the assistant dean for the Senior College of the College of Science, Literature, and the Arts.

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.



## III. A COURSE PRELIMINARY TO GRADUATE SOCIAL WORK\*

Preparation for social work is offered only in the Graduate School, with admission limited to fifty beginning students each year. Such students will be admitted only in the fall or winter quarters. All students must meet the general requirements of the Graduate School. For full information regarding professional preparation for social work, see the Bulletin of the Graduate School and the special bulletin of the Graduate Course in Social Work.

The following undergraduate course of study is recommended for those who desire to prepare for entrance to the Graduate Course in Social Work. In order to plan the undergraduate work wisely, students are advised to consult with advisers in the offices of the Department of Sociology and Social Work early in their course. The organization of the course aims to give the undergraduate the fundamentals of a broad modern education.

This course of study supersedes the one announced in the bulletin of this college for 1939-40. Students who entered our Senior College before September, 1940, may finish their work by meeting either the old or the new requirements.

Students who were in our Junior College before September, 1940, may enter our Senior College under either the old requirements or the new, but they must do the work in the Senior College under the new.

## JUNIOR COLLEGE

The work of the first two years, taken in the Junior College, consists of the regular academic requirements and fundamental courses in sociology, psychology, and political science. The requirements for admission to the Senior College are the same as those given under the headings *Required Courses and Distribution of Work* (pages 24-25) and *Amount and Quality of Work* (pages 25-26).

The specific subject requirements for the first two years are as follows:

1. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
2. Foreign language, 0 to 20 credits according to the schedule given on page 24.
3. Ten credits† in one of the social studies. (See page 24.) It is recommended that economics be not chosen to meet this requirement since there will be an opportunity to take courses in that subject in the junior or senior year.
4. Ten credits† in one of the natural sciences or 15 credits in Natural Science 1f-2w-3s "Orientation in the Natural Sciences." (See page 24.) It is recommended that zoology or physiology be taken to meet this requirement.
5. Electives to make a total of at least 90 credits for the two years' work, with an average of one honor point per credit.

The following courses must be included in the two years' work outlined in Items 1-5:

- Sociology 1 (Introduction to Sociology, 5 credits).
- Sociology 49 (Social Pathology, 3 credits).
- Political Science 1-2 (American Government and Politics, 6 credits).
- Psychology 1-2 (General Psychology, 6 credits).

Recommended electives are: History 1-2-3 (European Civilization) or Philosophy 1, 2, 3 (Problems of Philosophy, Logic, Ethics); Speech 1-2-3 or 5-6 (Fundamentals of Speech) or Composition 27-28-29 (Advanced Writing).

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

† Or 9 credits in a year course or 9 credits (6 semester credits) of advanced standing.

## SENIOR COLLEGE

The work of the junior and senior years is subject to the requirements of the course leading to the degree of bachelor of arts which are given under the headings *Senior College* and *Requirements for Graduation* on pages 26 and 27 with this exception:

The requirements of a major sequence and one or two minors (page 26) are replaced by the following interdepartmental sequence:

Sociology 53 (Elements of Criminology); 60 (Social Protection of the Child); 90 (Survey of Social Work); 101 (Social Organization); 114 (Rural Social Institutions).

Economics 82, 83, 84 (Competition and Monopoly in Modern Industry, The Inequality of Incomes, Comparative Economic Systems), unless the student has had Economics 6-7 (Principles of Economics), or its equivalent.

Psychology—at least six credits in Senior College courses, preferably Psychology 144-145 (Abnormal Psychology).

History 80-81-82 (Introduction to Economic History) or 83-84-85 (American Economic History) or six credits in Senior College courses in political science.

Philosophy 70 (Modern Philosophies of Social Reform).

Preventive Medicine—at least two Senior College courses.

Nine credits from the following courses in Sociology:

100. Social Psychology	120. Social Life and Cultural Change
102. Contemporary Penology	123. Methods of Social Research
103. Sociology of Conflict	146. Community Organization and the Social Setting of Recreation
110. Rural Organization	160. Population Problems
115. Religion As a Social Institution	
119. The Family	

Electives to make the required total (normally 90 credits).

Satisfactory completion of four years' work of this curriculum leads to the degree of bachelor of arts.

#### IV. COURSES PREPARING FOR ADMISSION TO THE PROFESSIONAL SCHOOLS

##### PREBUSINESS COURSE\*

To be eligible for admission to the School of Business Administration, the student must present ninety (90) credits, in addition to credits given for physical education, earned in a recognized college or university with one honor point per credit or a smaller number of earned credits which, together with quality credits, will total a minimum of ninety (90). One quality credit is granted for every five honor points in excess of one honor point per credit.

Quality credits earned in the Junior College may be applied only toward the ninety credits required for admission to the School of Business Administration. In other words, a student who has a surplus of honor points above the number required to complete ninety credits may not apply these for credit in the School of Business Administration. Any excess credits, however, other than quality credits, may be applied toward electives in the School of Business Administration.

The requirements for admission are as follows:

1. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
2. Nine credits in mathematics or *one* of the following laboratory sciences: botany, chemistry, geology, physics, or zoology.
3. Nine credits in *one* of the following social sciences: geography, history, political science, or sociology.†

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

† Social Statistics (Soc. 45) not accepted in fulfillment of this requirement.

4. Ten credits in Principles of Economics (Econ. 6-7).
5. Sufficient electives to complete the minimum of ninety (90) credits required for admission. The following courses should, if possible, be taken during the first two years, for most of them are prerequisites to certain courses in the core group:
  - Introduction to Economics (Econ. 1)
  - Elements of Money and Banking (Econ. 3)
  - Elements of Statistics (Econ. 5)§
  - Elements of Accounting (Econ. 20)¶
  - Principles of Accounting (Econ. 25-26)

Students who do not elect the above courses during the freshman and sophomore years will be required to cover the subject matter. This requirement may be fulfilled by completing the following courses offered in the School of Business Administration:

- Money and Banking (B.A. 57)
- Statistics Survey (B.A. 70)
- Elementary Accounting: Combined Course (B.A. 54-55)

In addition certain courses are required in special sequences in the school. These course prerequisites should be included in the Junior College program wherever possible. The major sequences and special course prerequisites are as follows:

1. Accounting: Mathematics of Investment (Math. 20), (prereq. Math. 8, or 6 and 7)
2. Advertising: General Psychology (Psy. 1-2)
3. Foreign Trade: General Psychology (Psy. 1-2); 9 credits in political science; reading knowledge of a foreign language
4. Finance: Mathematics of Investment (Math. 20), (prereq. Math. 8, or 6 and 7)
5. Industrial Administration: (See Bulletin of the Institute of Technology)
6. Insurance: General Psychology (Psy. 1-2); Mathematics of Investment (Math. 20), (prereq. Math. 8, or 6 and 7)
7. Merchandising: General Psychology (Psy. 1-2)
8. Personnel Management: General Psychology (Psy. 1-2)
9. Secretarial Training: General Psychology (Psy. 1-2); Secretarial Training; Typewriting (Econ. 32-33)
10. Statistics: Trigonometry (Math. 6); Commerce Algebra (Math. 8)
11. Department Store Training: General Psychology (Psy. 1-2); Secretarial Training: Typewriting (Econ. 32-33)
12. Office Management: General Psychology (Psy. 1-2); Secretarial Training: Typewriting (Econ. 32-33); Mathematics of Investment (Math. 20), (prereq. Math. 8, or 6 and 7)

#### DISTRIBUTION OF COURSES

Of the required and elective courses in economics, Course 1, which is strongly recommended but not required, belongs in the freshman year; Courses 3 and 5 may be taken in the freshman year (to make with Course 1 such a sequence as 1f-3w-5s), or one or both of them may be taken later; Courses 6-7 and 20, 25-26 belong in the sophomore year, but students are permitted to take Course 20 when they are third quarter freshmen.

Of the courses taken to meet the requirements of (1) English, (2) social science, (3) mathematics or laboratory science, freshmen should take at least two and thus leave not more than one for the sophomore year. To meet the third of these requirements, students who intend to specialize in accounting, banking, or statistics should take mathematics instead of natural science. Indeed, mathematics is recommended for all students planning to enter the School of Business Administration, either as a subject to meet this requirement or as an elective.

Courses in English, mathematics, all the laboratory sciences, and two of the social sciences (history and political science) are open to freshmen. See the list of "Studies for Freshmen" on page 13.

Of other courses recommended above, in Items 1-12, Psychology 1-2 (General Psychology) belongs in the sophomore year; Economics 32-33 (Typewriting)

§ Credit not granted in Econ. 5 to students who have had Social Statistics (Soc. 45).

¶ Students who have had a high school course or experience in bookkeeping will be admitted to Econ. 25 by passing a placement test. For other students Elements of Accounting (Econ. 20) is a prerequisite to Econ. 25.

may be taken as early as the student's second quarter in college, with the instructor's permission; foreign language, which is required in the foreign trade sequence, may be taken as early as the beginning of the freshman year.

#### TWO-YEAR PREEDENTAL COURSE\*†

The two-year preedental course required for admission to the School of Dentistry is a part of the six-year course in dentistry leading to the degree of doctor of dental surgery. During the two years of prescribed work students are registered in this college and subject to its regulations. It is desirable that students should have had chemistry and higher algebra in high school. The required courses are listed below:

1. Inorganic Chemistry 1-2-11 or 4-5-11 or equivalent (General Inorganic Chemistry and Qualitative Chemical Analysis, 12 credits)
2. Organic Chemistry 1-2 (Elementary Organic Chemistry, 8 credits)
3. English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
4. Physics 1a-2a-3a (Introduction to Physical Science, with laboratory included, 12 credits) or Physics 1-2-3 (Introduction to Physical Science, without laboratory, 9 credits). The 12-credit course, with laboratory, is recommended.
5. Zoology 1-2-3 (General Zoology, 10 credits)
6. Drawing, economics, history, Latin or a modern language (high school or college), political science, psychology, sociology, and speech are recommended as electives to make up a total of 90 quarter credits. (For each five honor points in excess of one honor point per credit, the number 90 is diminished by one.)

It is recommended that the two years' work be distributed as follows:

First year.—Chemistry 1-2-11 or 4-5-11 (12 credits); English 4-5-6 (9 credits) or English A-B-C (15 credits); Zoology 1-2-3 (10 credits); one or more elective courses.

Second year.—Organic Chemistry (8 credits); Physics 1-2-3 or 1a-2a-3a (9 or 12 credits); elective subjects to make a total of 90 credits for the two years' work.

#### COURSES PRELIMINARY TO THE COLLEGE OF EDUCATION

All students who desire to receive a state teacher's certificate upon graduation from the University of Minnesota must be graduates of the College of Education. In most cases students register in that college at the beginning of their junior year. In certain special four-year and five-year curricula, however, they should register in the College of Education at the beginning of their freshman year or as soon thereafter as they have made their curriculum choice. The special four-year curricula are:

Art Education	Music Education
Elementary Education	Physical Education for Men
Industrial Education	Physical Education for Women
Kindergarten, Primary, and Nursery	
School Education	

Special five-year curricula leading to the degree of master of education are in the following fields:

Art Education	Physical Education for Men
Industrial Education	Physical Education for Women
Music Education	

In curricula for Agricultural and Home Economics Education the preliminary work is done in the College of Agriculture, Forestry, and Home Economics. (See the bulletin of that college or the Bulletin of the College of Education.) In cur-

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

† For the three-year preedental course, which is a part of the seven-year course in Arts and Dentistry, see page 49.

ricula for Nursing Education and Public Health Nursing the student is registered for five quarters in the College of Science, Literature, and the Arts, and in the School of Nursing for two and a half years. After that she registers for three quarters in the College of Education or in the Medical School. (See page 42.)

For all other general and special curricula the prescribed work of the first two years is done in the College of Science, Literature, and the Arts.

The following general requirements apply to all students entering the College of Education at the beginning of their junior year:

1. A minimum of 93 credits for men and 95 credits for women, carried with an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, the number 93 or 95 is diminished by one.) For men 3 of these credits and for women 5 credits shall be in physical education. (No credit is granted for physical education courses by the College of Science, Literature, and the Arts; but upon transfer to the College of Education, the student will receive the credits and honor points earned in those courses.)

2. The student must have completed 6 credits in General Psychology.

3. At the time of entrance to the College of Education a student must present a certificate from the Students' Health Service indicating that he is free from physical defects that would prevent the successful pursuit of educational work.

4. Before entrance to the College of Education each student will be given a general examination designed to show his capacity to pursue professional curricula in education.

#### *Curricula Which Include Preliminary Work in the College of Science, Literature, and the Arts*

##### 1. A GENERAL COURSE PRELIMINARY TO THE COLLEGE OF EDUCATION WITH MAJORS AND MINORS IN ACADEMIC SUBJECTS\*

Students preparing to teach academic subjects in senior high schools and to qualify for the state high school standard certificate must have one major and one or more minors in subjects taught in high schools. The College of Education offers majors and minors in the following fields: English, speech, journalism; German, Latin, French, Scandinavian, Spanish; geography, history, political science, sociology; botany, chemistry, physics, zoology; mathematics. The specific requirements for the different majors and minors are given in the Bulletin of the College of Education and in the departmental statements in the University's *Combined Class Schedule for 1941-42*. Special combinations of majors and minors are provided in the natural science and social studies curricula.

The selection of suitable majors and minors and the most desirable combinations of subjects is very important in securing a high school teaching position. The College of Education has prepared a bulletin showing the demands for teachers in the various types of work, the fields of high school teaching in which there are the best prospects for securing positions, the best combinations of majors and minors, the personal and scholastic qualifications a prospective teacher should have, and other facts which may affect the choice of vocation or the choice of curriculum. Students are urged to secure a copy of this bulletin and to consult an adviser in the College of Education as early in their course as possible.

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

Before entering the College of Education the student must meet certain specific requirements in addition to those listed above. These requirements do not apply to the special four-year and five-year curricula.

1. The credits presented for entrance, exclusive of credits in physical education, must be earned in the following groups of college courses:

- Group A English
- Group B Foreign languages: German, Greek, Latin, Romance Languages, Scandinavian
- Group C Social sciences: Anthropology, Economics, Geography, History, Political Science, Sociology
- Group D Natural sciences: Astronomy, Botany, Chemistry, Geology and Mineralogy, Physiology, Physics, Psychology, Zoology
- Group E Mathematics
- Group F Journalism, Fine Arts, Speech, or such other courses in other colleges or departments of the University as are approved by the College of Education

2. Within the general requirements listed above the student during his high school and Junior College years must have completed the required work indicated under A, B, C, and D below. At least 20 credits in Groups B, C, and D must be completed in college.

Subject	In High School	In College
A. English	3 years	and 9 credits in composition
B. Language*	3 years in one language	or 20 credits in one language
	or 2 years in one language	and 10 credits in same language
	or 1 year in one language	and 15 credits in same language
C. Social sciences	2 years	or 10 credits† in one department
D. Natural sciences	2 years	or 10 credits‡ in one department§

NOTE.—In lieu of the specific course requirements indicated in the language group a student may take a comprehensive examination in an elected language to be conducted by a committee appointed by the dean of the College of Education.

3. Within the total credits stipulated under paragraph 1 a student must meet, in fields of study which are represented in prevailing high school curricula, the following requirement: at least 15 credits in a major field and at least 10 credits in each of two minor fields. The purpose of this requirement is to prepare the student for the study of advanced courses necessary to the completion of satisfactory teaching majors and minors.

## II. COURSES PRELIMINARY TO THE FOUR- AND FIVE-YEAR SPECIALIZED CURRICULA IN THE COLLEGE OF EDUCATION

The College of Education, in its undergraduate and graduate curricula, provides training for many different kinds of educational work: for positions as superintendents of schools, high school and elementary school principals, elementary school supervisors, teachers in normal schools and teachers colleges, educational counselors, school psychologists; teachers of special subjects and of special classes; school librarians, visiting teachers; positions in junior high schools, elementary schools, kindergartens, nursery schools, public health nursing, nursing education, recreational leadership, and school health work. In all cases except the special four-year and five-year curricula previously mentioned the preliminary

\* For students who enter this University with advanced standing, the number of credits required may be less than that indicated in this schedule. Any course of 9 credits (6 semester credits) may be substituted for the corresponding 10-credit course here.

† Or 9 credits in a year-course or 9 credits (6 semester credits) of advanced standing.

§ Fifteen credits in Natural Science 1f-2w-3s, "Orientation in the Natural Sciences," will be accepted as a substitute for 10 credits in one science. See the § footnote on page 24.

work is done in the College of Science, Literature, and the Arts. The Junior College work, however, is selected to meet the professional needs, and specific courses are required. The student should consult the Bulletin of the College of Education for the requirements of his curriculum and should confer with the adviser for that curriculum early in his course.

The specialized curricula offered by the College of Education based upon two years' work in the College of Science, Literature, and the Arts are:

Commercial Education	Social Studies
Library Methods	Speech Pathology
Natural Sciences	Teachers of Subnormal Children
Recreational Leadership	Visiting Teachers

Credits earned in required courses in Art Education, Industrial Education, and Physical Education will be granted upon transfer to the College of Education.

Professional training for administrative and supervisory positions, the teaching of professional subjects, positions as school counselors and school psychologists, and for other specialized work is secured by taking a fifth year in the Graduate School with a major in some field of education.

### III. COURSE PRELIMINARY TO NURSING EDUCATION AND PUBLIC HEALTH NURSING IN THE COLLEGE OF EDUCATION AND IN THE MEDICAL SCHOOL\*

For the first five quarters of the five-year curriculum in Nursing Education and Public Health Nursing the student is registered in the Junior College. She must complete the requirements listed below, and must earn an average of one honor point per credit.

English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)

Sociology 1 (Introduction to Sociology, 5 credits).

Psychology 1-2 (General Psychology, 6 credits).

Child Welfare 40 (Child Training, 3 credits). This course is also offered on the University Farm Campus as Home Economics Education 90.

Controlled electives—Any three of the following courses:

Preventive Medicine and Public Health 3 (Personal Health, 2 credits).

Physiology 51§ (6 credits) or Physiology 2 or 4§ (4 credits). See the outline below for the preferred course.

Home Economics 30 or 31 (Introduction to Nutrition, 2 or 3 credits).

Sociology 49 (Social Pathology, 3 credits).

Anatomy 3 (Elementary Human Anatomy, 3 credits).

Bacteriology 101-102§ (Medical Bacteriology, 9 credits) or Bacteriology 53§ (General Bacteriology, 5 credits) or Bacteriology 1 (Elements of Bacteriology, 4 credits). See the outline below for the preferred course.

Physiology 50§ or 1 (Physiological Chemistry, 4 credits).

Electives, exclusive of courses in physical education, to make a total of 75 credits for the work of the five quarters. (For each five honor points in excess of one honor point per credit, the number 75 is diminished by one.) The student's first choice of electives should include Zoology 1-2-3 (General Zoology, 10 credits); Chemistry 1-2 or 4-5 or 6-7 (General Inorganic Chemistry, 8 or 10 credits); 10 credits in social science. Other recommended electives are Philosophy 3 (Ethics, 5 credits); Anthropology 41 (Introduction to Anthropology, 5 credits); and Zoology 22 (Comparative Anatomy, 5 credits).

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

§ These courses prerequisite Zoology 1-2-3 and two quarters of inorganic chemistry; Physiology 51 prerequisites, in addition, Physiology 50 and anatomy.

Physical Education, six quarters (5 credits). One quarter of this requirement may be completed after registering in the School of Nursing. No credit is granted for physical education courses in the College of Science, Literature, and the Arts; but upon transfer to the College of Education, the student will receive the credits and honor points earned in those courses.

A suggested two-year sequence of required and elective courses, with the preferred courses in physiology and bacteriology, is as follows:

<i>First Year</i>		
<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
English 4f or Af	English 5w or Bw	English 6s or Cs
Chemistry 1f or 4f or 6f	Chemistry 2w or 5w or 7w	Sociology 1s
Zoology 1f	Zoology 2w	Zoology 3s
Preventive Medicine and Public Health 3f	Preventive Medicine and Public Health 3w	Anatomy 3s
Physical Education	Physical Education	Physical Education
Electives*	Electives*	Electives*
<i>Second Year</i>		
<i>Fall</i>	<i>Winter</i>	<i>Spring</i> §
Psychology 1f	Psychology 2w	Sociology 49s
Physiology 50f	Physiology 51w	Bacteriology 53s
Physical Education	Physical Education	Physical Education
Electives*	Electives*	Child Welfare 40s
		Home Economics 30s or 31s
		History of Nursing 1s

Upon completion of the above requirements the student registers in the School of Nursing for two and a half years. After that she registers for three quarters (1) in the College of Education, with a major in nursing education, or in public health nursing combined with health education or (2) in the Medical School, with a major in public health nursing. For information about nursing subjects see the Bulletin of the School of Nursing.

#### COURSE PRELIMINARY TO THE LAW SCHOOL¶

Students in the University preparing to enter the Law School register in the College of Science, Literature, and the Arts. Ninety credits of academic work are required for admission to the Law School. An average of at least one honor point for all credits earned up to the time of admission is also required. Excess honor points do not reduce the number of credits required.

Before trying to plan their college course preliminary to the Law School, students should read carefully the statements about the combined courses in Arts and Law and in Business Administration and Law on pages 47-49.

The following course has been outlined by the faculty of the Law School for the two years of college study required:

1. English A-B-C† (Freshman English, 15 credits) or English 4-5-6† (Freshman Composition, 9 credits)
2. Philosophy 1, 2, 3 (Problems of Philosophy, Logic, Ethics, 15 credits)
3. Political Science A-B-C (Introduction to Government, 9 credits)

\* Electives should be chosen to make on the average a program of 15 credits per quarter in addition to physical education. Social science should be chosen in the freshman year if possible.

† If a student takes English 4-5-6 rather than English A-B-C, or if he omits Freshman English composition because he is exempted from that requirement, the Law School recommends that he get at least six credits in more advanced courses offered by the Department of English.

§ During the spring quarter of the sophomore year the student should be registered in the School of Nursing.

¶ For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.



4. Economics 6-7 (Principles of Economics, 10 credits)
5. History 70-71-72 (English Constitutional History, 9 credits)
6. Psychology 1-2 (General Psychology, 9 credits)
7. Economics 27 (Accounting Survey, 5 credits)§
8. Electives to make the total at least 90 credits. Foreign language (0 to 20 credits according to the schedule given in paragraph 1b on page 24) and natural science (10 or 15 credits as indicated in paragraph 1d on page 24) should be included in these electives by students taking the combined course leading to the degrees of bachelor of arts and bachelor of laws which is outlined on page 48. Such students may take Philosophy 50 and 50A, 52 and 52A (Courses in the general history of philosophy) instead of Philosophy 1 and 3. Other suggested electives are: English History or American History, Economics, Modern Philosophies of Social Reform (Philosophy 70), Political Science, Sociology, and Speech.

It is recommended that the two years' work be distributed as follows:

**First year.**—English 4f-5w-6s (9 credits) or English Af-Bw-Cs (15 credits); Philosophy 2f-1w-3s (15 credits); Political Science Af-Bw-Cs (9 credits); History 4f-5w-6s (English History, 9 credits) which is not required but is recommended as an elective course in preparation for English Constitutional History.

**Second year.**—Economics 6f-7w, 27s (15 credits); History 70f-71w-72s (9 credits); Psychology 1f-2w (6 credits); elective courses to make a total of 90 credits for the two years' work.

The specific subjects listed above are not required for *admission* to the Law School or for the nonprofessional degree of bachelor of science in law; but, except in case of students who have a college degree when they begin the study of law, they (or substitutes approved by the dean of the Law School) are required for the professional degree of bachelor of laws. Candidates for the latter degree who lack any of these subjects and do not have a college degree when they enter the Law School must take them before beginning their third year in the Law School. They cannot be carried along with the law course, but may be taken in Summer Session.

#### COURSE IN MEDICAL TECHNOLOGY\*

The Course in Medical Technology is a four-year course given in the College of Science, Literature, and the Arts and in the Medical School. The degree of bachelor of science is awarded upon completion of the prescribed curriculum.

During the first two years the student is registered in this college and must earn 90 credits with an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, the number 90 is diminished by one.) The total number of honor points received in the following required subjects must at least equal the number of credits in those courses: English, chemistry, physics, zoology, anatomy, histology, bacteriology. After the satisfactory completion of the requirements the student is transferred to the Medical School for her junior year. The entire fourth year of twelve months is spent in a rotating practical service in the laboratories of the University Hospitals or affiliated hospitals. An additional six months for training in X-ray technique may be elected by the student.

The following courses or their equivalents must be completed before the student will be admitted to the junior year:

- English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
- Chemistry 1-2-11 or 4-5-11 (General Inorganic Chemistry and Qualitative Chemical Analysis, 12 credits); Analytical Chemistry 7 (Quantitative Analysis, 4 credits); Organic Chemistry 1-2 (Elementary Organic Chemistry, 8 credits).

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

§ This course in accounting is a special course for prelegal students. It is not open to students who have had Economics 20 (Elements of Accounting, 3 credits). Students who have taken that course may get more work in accounting by taking Economics 25-26 (Principles of Accounting, 3 credits per quarter).

Zoology 1-2-3 (General Zoology, 10 credits) and Zoology 21 (Histology, 5 credits).

Anatomy 3 (Elementary Human Anatomy, 3 credits).

Physics—A minimum of 5 credits in general physics. Physics 1-2-3 (Introduction to Physical Science, 9 credits) is required of students who will take any courses in X ray. It is advised for all students. Physics 1-2 (6 credits) without Physics 3 may be taken to meet the minimum requirement. In some instances special permission will be granted to students who will not take any courses in X ray to substitute one unit of high school physics for this requirement. Students who may subsequently study medicine in the regular medical course should take Physics 4-5-6 and the prerequisite mathematics. See the requirements in the premedical course on page 51.

Bacteriology 53 (General Bacteriology, 5 credits) or Bacteriology 101 (Medical Bacteriology, 5 credits).

Electives to make a total of 90 credits for the two years' work. There is no essential limitation to the subjects which may be chosen as electives. However, since it would be unwise for a student to take a wide variety of elective subjects without proceeding beyond the first and elementary courses, it is advised that in the first two years the student elect introductory courses in subjects which she expects to continue in her junior year. A program which includes only scattered electives will not be approved.

Courses in social sciences are recommended. Students who may study medicine or do graduate work should take German to meet requirements.\* It is advised that in any case the student include two years of a foreign language in her high school curriculum and that she continue that language at the University for at least two quarters so that she will have the equivalent of 20 credits of a language begun in college. (For example: 2 years of high school German and German 3-4 (10 credits) is the equivalent of German 1-2-3-4 in college.)

Recommended electives are listed in the Bulletin of the Course in Medical Technology.

NOTE.—English, chemistry, and general zoology should be taken in the freshman year.

For work in the Medical School consult the Bulletin of the Course in Medical Technology obtainable at the office of the registrar.

Students requiring further information, particularly those transferring from other colleges, should consult Dr. Charlotte M. Gast, assistant director of the Course in Medical Technology, 136 Medical Sciences Building. It may be necessary for transfer students to take courses during the Summer Session.

**Advisers.**—During the freshman year students in this course may consult advisers in the Junior College office (Room 106, Folwell Hall). During Freshman Week they should also register their names in the Medical School office, 136 Medical Sciences Building. After their freshman year they must submit their registration for approval to special advisers in the Medical School office.

## V. MILITARY SCIENCE AND TACTICS

**Credit for courses in military science.**—The Basic Course in Military Science and Tactics requires an average of two hours of classroom work and one hour of drill per week for which one credit per quarter is accepted towards graduation.

The Advanced Course requires an average of one hour of drill and four hours of classroom instruction per week (a total of five hours). Three credits per quarter are allowed.

\* Medical German (30-31-32 or 33-34) and its prerequisites (German 1, 2, 3 or equivalent) are required in the premedical curriculum. (See page 51.)

Military Science and Tactics credits are accepted as fulfilling degree requirements in any course of study (given entirely within this college) leading to the degree of bachelor of arts or bachelor of science.

A graduate of a Basic Course, R.O.T.C., who expects to remain in the University at least two more years, may be selected by the professor of military science and tactics to pursue an Advanced Course, provided he signs a contract with the University and the government by which he agrees to complete the Advanced Course, R.O.T.C., in this or any other institution where such course is given, to devote five hours per week to the military training prescribed, and to attend one summer training camp.

A student enrolled in an Advanced Course, R.O.T.C., is provided with a regulation officer's uniform and receives from the government a fixed monetary allowance while enrolled in this course, except during the period of summer training camp, when he is paid at the rate prescribed for the seventh grade in the Army.

All students who complete the Advanced Courses, R.O.T.C., if recommended by the professor of military science and tactics and the president of the University, will be commissioned in the Officers' Reserve Corps, Army of the United States.

## VI. NAVAL SCIENCE AND TACTICS\*†

The Naval Reserve Officers' Training Corps of the University of Minnesota provides a four-year course for selected, physically qualified male students. A student who completes this course is eligible for a commission as ensign, United States Naval Reserve, or as second lieutenant, United States Marine Corps Reserve, provided he applies for the commission, obtains a degree from the University, is recommended by the professor of naval science and tactics, and passes the prescribed physical examination. If the graduate is commissioned as ensign, U.S.N.R., he may, upon graduation, apply for one year of active duty at sea, upon completion of which he may be permitted to take an examination for a commission as an ensign in the regular line of the Navy, provided he is recommended by his commanding officer and is less than twenty-six years of age on June 30 of that year.

Cruises on board battleships, cruisers, and destroyers are held in the Atlantic and Pacific during the summer months of each year. As a prerequisite to a commission, a cruise is required of all students upon completion of the third year of the course, but all Naval R.O.T.C. students are eligible for a cruise each summer.

The course is divided into two groups, Navigation and Naval Science, the latter being further divided into two parts: the Basic Course consisting of the work of the first two years and requiring one hour of drill and two hours of classroom work per week; and the Advanced Course consisting of the work of the last two years and requiring one hour of drill and three hours of classroom work per week.†

The Navigation Course requires three hours of classroom work per week. It is covered in three quarters at the convenience of the student but should be completed during the Basic Course.

Credits for the summer cruises are given in the amount of  $\frac{3}{4}$  credit for each

\* For students who desire to include the courses in Navigation and Naval Science as a part of their work for a degree in any course of study given entirely within this College of Science, Literature, and the Arts, the total number of credits required will be 186 of which 36 will be for Navigation 1-2-3 and Naval Science 1-2-3, 4-5-6, 7-8-9, 10-11-12.

† The schedule of hours and days for the courses offered by the Department of Naval Science and Tactics is printed in the University's *Combined Class Schedule*. The Second Year Advanced Course in Naval Science (10-11-12) is not offered in 1941-42.

two weeks of cruise work. These credits are in excess of degree requirements and do not reduce the number of credits required for a degree.

Naval Science and Navigation credits are accepted as fulfilling the requirements for a degree. For the Basic Course,  $1\frac{1}{2}$  credits per quarter are allowed—a total of  $4\frac{1}{2}$  credits for each of the two years. For the Advanced Course, 3 credits per quarter are allowed—a total of 9 credits for each of the two years. For the Navigation Course, 3 credits per quarter are allowed—a total of 9 credits for the course.

Uniforms and equipment are furnished to students by the government without charge. All textbooks used are loaned to the student. All Naval R.O.T.C. students attending cruises are furnished transportation and subsistence. Students enrolled in the Advanced Course are paid monthly commutation of subsistence by the Navy Department, and cruise pay on the Advanced Course cruise. The total pay received from the government amounts to about one hundred ninety dollars (\$190) for the two years in the Advanced Course.

All prospective candidates for the Naval R.O.T.C. *must* apply in person to the professor of naval science and tactics, University of Minnesota, before registering for the course, as enrolments are limited by law and a prescribed physical examination must be taken before the candidate can be considered.

#### NAVIGATION

Navigation courses given by the Department of Naval Science and Tactics are open to all university students.

Navigation 1f or 1s. Elementary Navigation and Piloting. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, dead reckoning. Three hours per week for one quarter. (3 cred.; prereq. plane trigonometry.)

Navigation 2f or 2w. Celestial Navigation. Lines of position, the sextant, the astronomical triangle, time and the chronometer, marine surveying, star identification. Three hours per week for one quarter. (3 cred.; prereq. Navigation 1f or 1s.)

Navigation 3w or 3s. Deep Sea and Aerial Navigation. Determination of lines of position of sun, moon, stars, and planets. Short tabular methods. The navigator's day's work at sea. Chart work and practical problems. (3 cred.; prereq. Navigation 2f or 2w.)

#### VII. SIX-YEAR COURSE IN ARTS AND ARCHITECTURE LEADING TO THE DEGREES OF BACHELOR OF ARTS AND BACHELOR OF ARCHITECTURE\*

During the first four years of this course the student is registered in the College of Science, Literature, and the Arts and follows the plan of study prescribed for a bachelor of arts degree with a major in architecture. The requirements for that degree are given on pages 23-27.

Of the courses listed below, Civil Engineering 38-39-41 (9 credits) is not a part of the work required (normally 180 credits) for the bachelor of arts degree. It is an extra requirement which must be taken as a prerequisite for the work of the last two years of this six-year course in Arts and Architecture.

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule* and the *Bulletin* of the Institute of Technology.

The work of the four years should include the following courses:

*Required for the Major Sequence*

COURSE No.	TITLE	CREDITS
Arch. 4-5-6	Graphic Representation .....	6
Arch. DP-I	Drawing and Painting, Grade I.....	6
Arch. DP-II	Drawing and Painting, Grade II.....	6
Arch. 51-52-53	History of Architecture .....	9
Arch. 57-58-59	Building Materials and Methods.....	6
Arch. AD-I	Architectural Design, Grade I.....	15
Arch. AD-II	Architectural Design, Grade II.....	18

*Additional Special Requirements*

Mathematics 6, 7, 30	Trigonometry, College Algebra, Analytic Geometry .....	15
Mathematics and Mechanics 91, 92, 93	Calculus, Mechanics for Architects, Strength of Materials.....	12
Civil Engineering 38-39-41	Structural Analysis and Design .....	9

During the last two years of the course, or upon completion of the requirements for the bachelor of arts degree, the student is registered in the School of Architecture of the Institute of Technology to complete the requirements for a bachelor of architecture degree as prescribed in the Bulletin of the Institute of Technology for the five-year course in architecture.

### COMBINED COURSES IN ARTS, BUSINESS ADMINISTRATION, AND LAW

There are three of these combined courses, two in Arts and Law (VIII-IX) and one in Business Administration and Law (X).

With respect to the degrees mentioned in the two combined courses in Arts and Law, the bachelor of arts degree is conferred on recommendation of the College of Science, Literature, and the Arts. Two degrees are conferred on recommendation of the Law School, namely a nonprofessional degree of bachelor of science in law, and the professional degree, bachelor of laws. The normal courses for these degrees are as follows: Students who have a B.A. or equivalent degree when they enter the Law School may qualify for the professional degree, bachelor of laws, in three years. Students who do not have a degree when they enter the Law School first register for the degree of bachelor of science in law for which the course is two years. Students who have obtained the degree of bachelor of science in law with an average grade of 73, and have the required subjects listed in the prelaw course, may qualify for the professional degree, bachelor of laws, in two years.

### VIII. SIX-YEAR COMBINED COURSE IN ARTS AND LAW, LEADING TO THE DEGREES OF BACHELOR OF SCIENCE IN LAW AND BACHELOR OF LAWS\*

This course requires two years of college work and four years in the Law School.

Students who complete the two years of college work required for admission to the Law School, stated on page 42, in the College of Science, Literature, and the Arts of this University, or in some other accredited college, and have 90 credits,

\* There are two combined courses in Arts and Law. Students interested in either one should read (1) the requirements for both, (2) the preliminary paragraph entitled "Combined Courses in Arts, Business Administration, and Law," above, and (3) the paragraph entitled "Course Preliminary to the Law School" (page 42).

exclusive of quality credits, with an average of one honor point per credit for all credits earned, become eligible for the degree of bachelor of science in law on completion of two years in the Law School. Law work may be selected to suit the needs of the student, and may be restricted to commercial law for students desiring a preparation for business. Students completing this course may register for the degree of bachelor of laws under the conditions above stated, and may thus secure the two degrees in six years.

IX. SEVEN-YEAR COMBINED COURSE IN ARTS AND LAW,  
LEADING TO THE DEGREES OF BACHELOR OF  
ARTS AND BACHELOR OF LAWS\*

This course requires three years of college work and four years in the Law School. The first two years of the college work may be taken in any accredited college, but the third year must be taken in the College of Science, Literature, and the Arts of this University. All three years of college work may be taken before entering the Law School, or two years before entering the Law School, and the third year after the completion of one year or more of law work. The latter plan enables the student to select college work in which he may have become interested during his law course.

Students in this combined course must, before transferring to the Law School, complete the requirements for admission to the Senior College of the College of Science, Literature, and the Arts, stated on pages 23-26. These requirements include foreign language and natural science. (See paragraphs 1b, 1d on page 24.) The student must secure at least 90 credits with an average of at least one honor point per credit for all credits earned. He must also secure, either before entering the Law School or after completing one year or more of the law course, 45 additional college credits, of which at least 30 must be of Senior College grade, with an average of at least one honor point per credit. This number of credits required may be reduced by application of the "quality credit" rules given in paragraphs 33, 34, 35 on page 6. This third year of work must be approved by the assistant dean for the Senior College of the College of Science, Literature, and the Arts. In order to satisfy the requirements for the degree of bachelor of laws, the three years of college work must also include the subjects specified on page 42 for the prelaw course (or substitutes approved by the dean of the Law School).

The degree of bachelor of arts is conferred when the 135 credits of college work specified above and at least the first year of the course in the Law School, with the standing required by that school for graduation, are completed. The degree of bachelor of laws is conferred when the work of all seven years is completed.

X. SEVEN-YEAR COMBINED COURSE IN BUSINESS ADMIN-  
ISTRATION AND LAW LEADING TO THE DEGREES OF  
BACHELOR OF BUSINESS ADMINISTRATION  
AND BACHELOR OF LAWS

This program consists of two years of prelaw and prebusiness work as specified below, approximately one and one-half years in the School of Business Administration instead of the full two-year program, and three and one-half years in

\* There are two combined courses in Arts and Law. Students interested in either one should read (1) the requirements for both, (2) the preliminary paragraph entitled "Combined Courses in Arts, Business Administration, and Law," above, and (3) the paragraph entitled "Course Preliminary to the Law School" (page 42).

the Law School instead of the full four-year program, thus qualifying for both the bachelor of business administration and the bachelor of laws degrees in seven years.

The prelaw and prebusiness work must amount to 90 credits, exclusive of quality credits, and shall include the regular prelaw course\* except Economics 27 and in addition Economics 5 (Elements of Statistics) and Economics 20, 25-26 (Elements of Accounting and Principles of Accounting).

There are two options for the remaining five years:

- A. The third year exclusively in the Law School and the fourth year exclusively in the School of Business Administration, or vice versa. The fifth and sixth years exclusively in the Law School and the seventh year to be divided between the two schools, approximately half of the program being in each school.
- B. The distribution of both the business administration and the law course throughout the five-year program.

The course requirements in Business Administration include the general core group courses exclusive of Business Law (B.A. 51-52-53). This amounts to a total of 36 credits. Substitutes, such as Economics 185 for B.A. 77, B.A. 184 for B.A. 89, Economics 172 for B.A. 71, may be made with the approval of an adviser. The remaining courses—approximately 32 credits—may be elected from the Senior College courses in economics and business administration with the approval of an adviser.

The course requirements in the Law School include all the courses of the first and second years, the required courses of the third and fourth years, and electives sufficient with the required courses to make a total of approximately 68 credits in those years.

Students will be registered for the joint program in the Law School and the School of Business Administration throughout the five-year period. Their programs will be subject to approval of an adviser from the Law School and an adviser from the School of Business Administration.

## XI. SEVEN-YEAR COURSE IN ARTS AND DENTISTRY, LEADING TO THE DEGREES OF BACHELOR OF ARTS AND DOCTOR OF DENTAL SURGERY†

During the first three years of this course, the student does his work in the College of Science, Literature, and the Arts, subject to the regulations of the college, and must secure at least 135 credits, with an average of one honor point per credit for all credits earned. (This number of credits required may be reduced by application of the "quality credit" rules given in paragraphs 33, 34, 35, on page 6.) He must complete the requirements for admission to the Senior College, which are given on pages 23-26, and also the work in chemistry, physics, and zoology prescribed for admission to the School of Dentistry (see page 38).

During his third year, the student elects work in this college subject to the approval of the assistant dean for the Senior College. The work of the freshman and sophomore years in the School of Dentistry, exclusive of technical and practical work, when completed according to the standards required by that school, counts as the equivalent of the fourth year (45 credits) of the Arts course.

\* See page 42 of this bulletin.

† Only students who have completed the required work in the College of Science, Literature, and the Arts before entering the professional school will be permitted to avail themselves of the privilege of securing the B.A. degree in this combined course.

## COURSES LEADING TO THE DEGREE OF DOCTOR OF MEDICINE\*

There are two eight-year courses of study which lead to the degree of doctor of medicine. (See XII, XIII, below.) Each of them requires three full years of college work (135 credits exclusive of quality credits) which must include the courses prescribed for admission to the Medical School. In the first one (XII, below), the student may freely choose the elective courses to make up the total of 135 credits. He will receive the degree of bachelor of science after he completes two years of work in the Medical School. In the second of the two courses (XIII, below), the student must meet the requirements for admission to the Senior College of Science, Literature, and the Arts which he should enter normally, after two years of residence in the Junior College. His program for the third year must be submitted for approval to the assistant dean for the Senior College. He will receive the degree of bachelor of arts after he completes satisfactorily one year of work in the Medical School.

XII. EIGHT-YEAR COURSE IN SCIENCE AND MEDICINE,  
LEADING TO THE DEGREES OF BACHELOR OF  
SCIENCE, BACHELOR OF MEDICINE,  
AND DOCTOR OF MEDICINE§¶

The minimum requirements for admission to the Medical School are three full years of college work, amounting to 135 credits†, with an average of at least one honor point per credit.

The premedical work, for which the student is registered in the College of Science, Literature, and the Arts, must include the required courses listed below or their equivalent as approved by the Students' Work Committee of the Medical School.

## RESIDENCE

First choice is given to native residents of Minnesota; second choice is given to residents of adjoining states which do not have medical schools; residents of states other than these will be admitted to the Medical School only under exceptional circumstances. Applicants who become residents of the state after graduating from high school will be considered with this group.

\* Students who want a college degree before entering the Medical School may include all of the required premedical subjects in the "Course Leading to the Degree of Bachelor of Arts" for which the requirements are stated on pages 23-27. They may find it to their advantage to take the course with a liberal arts major rather than a major in one department. The difference is explained in paragraphs under the headings "Requirements in the Curriculum in Liberal Arts" (page 26) and "Requirements in the Curriculum for Concentration" (page 26).

† The following quotation from the bulletin of the Medical School applies to students who do their prerequisite work here. "The total number of credits for admission to the Medical School required of students who do their premedical work at Minnesota may, at the discretion of the Admissions Committee, be diminished in the case of superior students, under the quality credit rule of the College of Science, Literature, and the Arts. Required courses may not be omitted unless special permission is obtained from the Admissions Committee of the Medical School."

§ There are two eight-year courses leading to the degree of doctor of medicine. Students interested in either one should read (1) the requirements for both, and (2) the paragraph entitled "Courses Leading to the Degree of Doctor of Medicine," above.

¶ For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.



*Required Courses*

- English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement. (See page 12.)
- Zoology 1-2-3 (General Zoology, 10 credits) and Zoology 83 (Introduction to Genetics and Eugenics, 3 credits).
- Chemistry—Inorganic Chemistry 1-2-11 or 4-5-11 or equivalent (General Inorganic Chemistry and Qualitative Chemical Analysis, 12 credits); Analytical Chemistry 7 (Quantitative Analysis, 4 credits); Organic Chemistry 1-2 (Elementary Organic Chemistry, 8 credits); and Physical Chemistry 107-108 (Elementary Physical Chemistry, 8 credits).
- Physics 4-5-6 (General Physics, 15 credits).
- Mathematics—as a prerequisite for physics: Course 1 (Higher Algebra, 5 credits) unless the student has had high school higher algebra; Course 15-16 (Elementary Mathematical Analysis, 10 credits) or equivalent.
- German sufficient to secure a reading knowledge. Students may meet this requirement by passing German 30-31-32 or 33-34 (Medical German), or by taking a special examination after completing two years of college German. This examination is conducted by the German Department.
- Psychology 1-2 (General Psychology, 6 credits).

These required courses cannot be distributed in a three-year program which will be the same for all students. Below are two arrangements with some suggested variations. Students can work out other variations for themselves. Many will find it to their advantage to take one or more required courses in the summer.

1. For students who begin the required German in college:

**First year.**—Chemistry 1f-2w-11s or 4f-5w-11s (12 credits); German 1f-2w-3s (15 credits); Mathematics 1f-15w-16s or 15f-16w (15 or 10 credits); Zoology 1f-2w-3s (10 credits); an elective subject in the spring for those who take Mathematics 15f-16w.

**Second year.**—Analytical Chemistry 7f and Organic Chemistry 1w-2s (12 credits); English 4f-5w-6s (9 credits) or English Af-Bw-Cs (15 credits); German 30f-31w-32s (9 credits); Physics 4f-5w-6s (15 credits).

**Third year.**—Physical Chemistry 107f-108w (8 credits); Psychology 1f-2w (6 credits); Zoology 83s (3 credits); elective courses to make a total of 135 credits for the three years' work.

In this program, the work of the first year is heavy, that of the second year is normal, and the third year's work is light. A student can get a more even distribution of the required courses by taking English 4f-5w-6s in the freshman year instead of German and by taking German 1f-2w-3s in the sophomore and 30f-31w-32s in the junior year.

2. For students who have had two years of high school German:

**First year.**—Chemistry 1f-2w-11s or 4f-5w-11s (12 credits); German 3f-33w-34s (15 credits); Mathematics 1f-15w-16s or 15f-16w (15 or 10 credits); Zoology 1f-2w-3s (10 credits); an elective subject in the spring for those who take Mathematics 15f-16w.

**Second year.**—Analytical Chemistry 7f and Organic Chemistry 1w-2s (12 credits); English 4f-5w-6s (9 credits) or English Af-Bw-Cs (15 credits); Physics 4f-5w-6s (15 credits); Psychology 1f-2w (6 credits); an elective subject in the spring.

**Third year.**—Physical Chemistry 107f-108w (8 credits); Zoology 83s (3 credits); elective subjects to make a total of 135 credits for the three years' work.

In this program, the work of the first year is heavy, that of the second year is normal, and the third year's work is light. A student can get a more even distribution of the required courses by postponing Zoology until the sophomore year and Psychology until the junior year.

The following subjects are recommended as electives: English composition and literature, speech, advanced zoology (such as Introductory Animal Parasitology), freehand drawing, history, French, higher mathematics, biostatistics or statistics, advanced psychology, sociology (especially social pathology), philosophy, political

science, and cultural subjects generally. General Bacteriology, a Medical School subject, may not be presented for admission to the Medical School.

For admission to the Medical School, a candidate's record must show a number of honor points at least equal to the total number of credits in the group of required subjects; also a number of honor points at least equal to the total number of credits in all subjects. (A higher average is exacted of nonresident applicants.) He must take a medical student's aptitude test and a battery of tests for premedical students given by the University Testing Bureau. The scores of these tests are considered by the Students' Work Committee in advising students and determining admission. A student applying for admission for the fall quarter must do so before December 1 of the preceding year. All admissions are subject to the limited registration regulations of the Medical School.

The work during the fourth year is taken in the Medical School and is credited toward the degree of bachelor of science. To secure this degree, a student, in addition to the requirements for admission, must have completed the first two years of the medical course and have passed, with a "C" average, the comprehensive examination in these years.

Students who have completed elsewhere three or more years of collegiate or university work which includes the required subjects specified above and which is in other respects the full equivalent of the three years of academic work required in this eight-year course, will be awarded the degree of bachelor of science on recommendation of the faculty of the Medical School, provided they meet the scholarship requirements stated above.

The foregoing regulations governing the quality and amount of premedical training required for admission to the Medical School will be enforced for those who present the minimum amount of work. In cases of mature and superior students, especially such as have taken degrees and have made special progress along some line (even tho it may not have been closely related to medicine), concessions may be made. Such cases will be considered individually upon petition to the dean of the Medical School.

A broad general education is considered fundamental to medical study, but it should be borne in mind that no student can pursue the medical course to advantage without knowledge of biology, chemistry, and physics.

### XIII. EIGHT-YEAR COURSE IN ARTS AND MEDICINE, LEADING TO THE DEGREES OF BACHELOR OF ARTS, BACHELOR OF MEDICINE, AND DOCTOR OF MEDICINE\*§

During the first three years of this course, the student is registered in the College of Science, Literature, and the Arts, subject to the regulations of the college, and must secure at least 135 credits, with an average of one honor point per credit for all credits earned. He must complete the requirements for admission to the Senior College, given on pages 23-26, and also the work in chemistry, mathematics, physics, psychology, zoology, and foreign language prescribed for the eight-year course in Science and Medicine (page 50).†

\* Only students who have completed the required work in the College of Science, Literature, and the Arts before entering the professional school will be permitted to avail themselves of the privilege of securing the B.A. degree in this combined course.

† For recommended electives and the restrictions governing them, see page 51.

§ There are two eight-year courses leading to the degree of doctor of medicine. Students interested in either one should read (1) the requirements for both, and (2) the paragraph entitled "Courses Leading to the Degree of Doctor of Medicine" on page 50.

During his third year, the student elects work in this college subject to the approval of the assistant dean for the Senior College. The first year of the course in the Medical School, when completed with the standards required by that school, counts as the equivalent of the fourth year (45 credits) of the Arts course.

For admission to the Medical School, a student's record must show a number of honor points at least equal to the number of credits in the group of required subjects; and also a number of honor points at least equal to the total number of credits. A higher standard is exacted of nonresident applicants. The student must have a reading knowledge of German and must be accepted by the Medical School under the limited registration regulations of that school. Exceptions to these requirements may be granted to superior students on petition to the Students' Work Committee of the Medical School.

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*The Bulletin of the*  
UNIVERSITY of MINNESOTA

The Law School  
Announcement for the Years  
1941-1943

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Volume XLIV, Number 39

June 18, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

## THE ASSOCIATION OF AMERICAN LAW SCHOOLS

The Association of American Law Schools was organized in 1900 for the purpose of improving legal education. Membership is dependent upon maintaining the standards set by the association. These standards have been advanced from time to time as conditions warranted. At present they are somewhat in advance of those approved by the American Bar Association stated below. The association now includes 92 of the 180 law schools in the United States.

*The University of Minnesota Law School is a charter member of the Association of American Law Schools.*

### THE AMERICAN BAR ASSOCIATION STANDARDS FOR ADMISSION TO THE BAR

The following resolution was adopted by the American Bar Association September 1, 1921. It was approved by a national conference of state and local bar associations, February 24, 1922, and by the Minnesota State Bar Association, September 1, 1922.

"(1) The American Bar Association is of the opinion that every candidate for admission to the bar should give evidence of graduation from a law school complying with the following standards:

"(a) It shall require as a condition of admission at least two years of study in a college.

"(b) It shall require its students to pursue a course of three years' duration if they devote substantially all of their working time to their studies, and a longer course, equivalent in the number of working hours, if they devote only part of their working time to their studies.

"(c) It shall provide an adequate library available for the use of the students.

"(d) It shall have among its teachers a sufficient number giving their entire time to the school to insure actual personal acquaintance and influence with the whole student body.

"The Council on Legal Education and Admission to the Bar is directed to publish from time to time the names of those law schools which comply with the above standards and of those which do not and to make such publications available so far as possible to intending law students."

*The University of Minnesota Law School is approved by the Council on Legal Education and Admission to the Bar of the American Bar Association.*

## FACULTY

- Walter C. Coffey, M.S., LL.D., Acting President
- ✓ Everett Fraser, B.A., LL.B., Dean of the Law School and Professor of Law
- Wilbur H. Cherry, B.A., LL.B., Professor of Law
- Edward G. Jennings, M.A., LL.M., Professor of Law
- ✓ Henry L. McClintock, Ph.B., LL.B., S.J.D., Professor of Law
- Maynard E. Pirsig, B.A., LL.B., Professor of Law
- William L. Prosser, B.A., LL.B., Professor of Law
- ✓ Horace E. Read, B.A., LL.M., S.J.D., Professor of Law
- ✓ Henry Rottschaefer, B.A., J.D., S.J.D., Professor of Law
- ✓ Edward S. Bade, B.A., LL.M., Associate Professor of Law
- ✓ Stanley V. Kinyon, B.A., LL.B., Associate Professor of Law
- Alburey Castell, Ph.D., Assistant Professor of Philosophy
- ✓ Stefan A. Riesenfeld, LL.D., J.U.D., S.J.D., Assistant Professor of Law
- John F. Bonner, LL.B., Lecturer in Practice
- Paul S. Carroll, B.A., LL.B., Lecturer in Practice
- Richard H. Bachelder, B.A., LL.B., Instructor in Practice
- Leo N. DeMouly, B.A., LL.B., Instructor in Practice
- Arthur C. Pulling, Law Librarian

## LAW AS A PROFESSION: CHOICE AND TRAINING

Recent surveys in several states reveal that there are more lawyers than can make a living in practice, that overcrowding is resulting in unethical conduct, and that lawyers with poor scholarship records are not likely to succeed in practice. On the other hand, no profession offers greater opportunities to the man of unusual attainments. There are not enough such to supply the private service and the public leadership that the country needs.

A student contemplating the study of law should know that only able students have good prospects of success. A high school student should not choose law unless he stands at least in the highest quarter of his class. If in addition to high standing, he has mathematical ability—not an extensive study of mathematics, but high grades in the mathematics studied—he is likely to be capable as a law student. On the other hand, success in memorizing, or in debating is not proof of capacity for law.

Training for life as a lawyer should be regarded as having its beginning in high school. A high school student who plans to study law should take in high school four years of English, four of mathematics, four of Latin if available, otherwise four of a modern language, two of natural science, and two of history.

From two to four years of college work are required for admission by the better law schools. A student's prospects of success in law school are greatly enhanced by a high record in his college work. He should not enter law school unless he stands in the upper half of his college class.

The choice of a law school is highly important. Graduates of many of the 180 law schools in the United States are handicapped at the start. They are not permitted to take bar examinations in some states, and many, where they are permitted to take them, fail to pass these examinations. Some careers are not open to such graduates at all. Some succeed because of their native ability, but success is more difficult because of poor training. The student should choose a school which has a reputation for high standards. If he succeeds in such a school, he is well launched on his career; if he fails, it is better for him to know his lack of legal aptitude and to choose a more suitable career while he is still young.

Students who make a high record in a good law school are in demand; others are not. Students do not realize the weight that is given to their school records not only by their first employers, but also for later positions. The United States Department of Justice, for example, investigates the school records of candidates for appointment as assistant attorney-general, district attorney, or judge, altho such candidates have been out of school for many years.

A book, *Lawyers and the Promotion of Justice*, recently published by the Russell Sage Foundation, New York, contains information valuable to prospective law students.



## GENERAL INFORMATION

### OBJECT AND METHOD OF INSTRUCTION

The Law School of the University of Minnesota was established in 1888. Its course is designed to provide a thoro training in the law, to prepare students for practice in any jurisdiction where the Anglo-American legal system prevails, and to qualify them for public service and public leadership.

This Law School has developed in the last ten years a course of training that differs in important respects from the courses in most other American law schools. This course consists of two years in college and four years in Law School. The college work is carefully selected. The Law School course consists of three years of vocational legal training and one year of broad professional training. The vocational training is the same as the course for the professional degree in most law schools. The professional training is not offered in most schools, and is graduate work in the schools where it is available.

The course is based on a consideration of the functions of the lawyer in society. He must aid clients in obtaining justice. For that purpose he needs the vocational training. But lawyers have other functions. They provide a trained leadership for molding the institutions and laws of the country. Lawyers occupy a key position. They control the courts, and have more influence than any other group in the legislative and administrative branches of government. The course emphasizes lawyers' responsibility for making laws as well as for administering them.

Governments and laws are designed to enable men to live in a peaceful society. They are the products of a ceaseless evolutionary process. Laws change as conditions change. To guide these changes, lawyers must not only know the law and its history, but they must also understand those social, economic, and political forces that mold it.

Law schools have devoted their energies to teaching the rules of law. They have relied upon the colleges for the broad training essential to the lawyer's function, and expected students to get such training before entering law school. They have required three or four years of college work and only three years in law school. The results have not been satisfactory. Before studying law, the college student does not understand the nature of law and the function of the lawyer in society, does not see the relation of his college work to his career as a lawyer, does not know what to choose for a college course, and often lacks interest in his college work. The three years available for law school study are necessary for vocational training and do not afford opportunity for a broad professional training.

This Law School has found that better results can be obtained by a shorter period of college work with prescribed studies, and a longer period of law school work with broad professional training in the additional time. Experience proves that students with two years of college work study law as effectively as students with three or four years of college work. They study advanced social science more effectively after they have studied law. The plan permits a better sequence of studies. The student sees the relation of his professional studies to his career, and has a greater interest in them. He chooses his courses more wisely and studies them more intensely. The course for the professional law degree will be found in the descriptions of the prelaw course and the course for the bachelor of laws degree.

The method of instruction is adapted to the nature of the course. The "case system" is used in the first two years, and in some later courses. This method of teaching law, which has been approved by experience and which is now employed in the leading law schools of the country, has the twofold merit of enabling the student to acquire a thoro and practical knowledge of legal principles, and to be-

come familiar with those processes of legal reasoning which have determined the form and character of our jurisprudence, and will govern its future development. Other courses are conducted by means of readings and class discussion.

The faculty is composed chiefly of resident professional law teachers who devote their entire time and energy to teaching. The courses in practice are taught by men experienced in practice.

#### LAW BUILDING

A new law school building was erected in 1928. It is situated on the east bank of the Mississippi near the center of the campus. It contains four classrooms, a reading room 140 by 50 feet capable of seating 260 students, stackroom for 150,000 volumes, offices of instructors, *Law Review* room, and rooms for men and women students. The building is well equipped and admirably suited for the work of a modern law school.

#### LIBRARIES

The library of the Law School contains over 120,000 volumes and is one of the six largest law school libraries in the United States. It includes all the American reports, state and federal, Interstate Commerce and other commission reports, nearly all the English, Australian, New Zealand, Indian, and Canadian reports, the English, federal, and state statutes (with a few exceptions), the standard digests, encyclopedias, legal periodicals, and textbooks. To this collection substantial additions are constantly being made. The State Law Library, located at the Capitol in St. Paul, is also accessible to students in the Law School.

#### STATE AND UNITED STATES COURTS

The University is located within easy reach of both the federal and state courts. The United States courts are in session in St. Paul and Minneapolis during the greater part of the school year. The Supreme Court of Minnesota, sitting in St. Paul, the district courts of Ramsey and Hennepin counties, and the municipal courts of St. Paul and Minneapolis are open and in session almost constantly, and afford the student abundant opportunity for witnessing the trial of actual cases and hearing the argument of appeals.

#### MINNESOTA LAW REVIEW

The *Minnesota Law Review* is a legal periodical published by the faculty and students of the Law School. There are seven regular issues each year, from December to June, inclusive, containing leading articles by law teachers, judges, and lawyers, and notes and comments on recent cases prepared by students in the school. On the basis of scholastic standing, students in the second, third, and fourth year classes are given the privilege of competing for election to membership on the editorial board of the *Review*. Membership on the board is an honor, and an opportunity for training in legal research of the highest value. Law offices prefer graduates who have been members of the board. Work done on the *Review* is given weight by the faculty in awarding honors in the Law School. The *Review* is the official journal of the Minnesota State Bar Association, and is sent to all members of the association.

#### ORDER OF THE COIF

The school has a chapter of the Order of the Coif, a national honorary society of law students. Election to the society is made by the faculty at the close of the senior year, from the 10 per cent of the graduating class highest in scholarship.

## ADMISSION

Application for admission should be sent to the director of admissions and records of the University together with a transcript of the applicant's college record. Applications from nonresidents of Minnesota must be accompanied by a fee of \$5. This fee is not returned, but is credited on the first term bill if the applicant is admitted and registers.

Applicants who have a bachelor of arts or equivalent degree, and a satisfactory scholastic record, are admitted to a three-year law course as candidates for the professional degree of bachelor of laws. Other applicants on first entering the Law School are registered for the degree of bachelor of science in law. In order to be admitted as a candidate for that degree, a student must have completed at least two years of work in the College of Science, Literature, and the Arts of the University of Minnesota, or in some other accredited college. The minimum requirement for admission is 90 quarter (60 semester) credits. An average of one honor point for each credit in all college work is necessary for admission. Excess honor points do not count as credits for admission to the Law School.

The specific subjects listed in the prelaw course below are not required for admission to the Law School, or for the degree of bachelor of science in law, but, except in the case of students who have a college degree when they begin the study of law, they (or substitutes approved by the dean of the Law School) are required before registering for the professional degree of bachelor of laws. Candidates for the latter degree who lack any of these subjects and do not have a college degree when they enter the Law School must take them before beginning their third year in the school. They cannot be carried along with the law course, but may be taken in Summer Session. (See Courses and Degrees.)

## PRELAW COURSE\*

Students in the University preparing to enter the Law School register in the College of Science, Literature, and the Arts. Before trying to plan their college course preliminary to the Law School, students should read carefully the statements about the combined courses in Arts and Law, and Business and Law. The following course has been outlined by the faculty of the Law School for the two years of college study required:

	CREDITS
1. English A-B-C (Freshman English) or Composition 4-5-6† (Freshman Composition)	15 or 9
2. Philosophy 1, 2, 3 (Problems of Philosophy, Logic, Ethics)§	15
3. Political Science A-B-C (Introduction to Government)	9
4. Economics 6-7 (Principles of Economics)	10
5. History 70-71-72 (English Constitutional History)	9
6. Psychology 1-2 (General Psychology)	6
7. Economics 27 (Principles of Accounting)	5
8. Electives to make the total at least 90 credits. Suggested electives are: Modern Philosophy of Social Reform (Philosophy 70), Natural Science, Economics, Political Science, Sociology, and Speech.	

\* For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

† If a student takes Composition 4-5-6 rather than English A-B-C, or if he omits Freshman Composition because he is exempted from that requirement, the Law School recommends that he get at least six credits in more advanced courses offered by the Department of English.

§ Students who take three years of college work may substitute Philosophy 50 and 50A, 52 and 52A (History of Philosophy) for Philosophy 1 and 3.

COMBINED COURSE IN ARTS AND LAW, LEADING TO THE DEGREES OF  
BACHELOR OF ARTS AND BACHELOR OF LAWS

This course requires three years of college work and four years in the Law School. The first two years of the college work may be taken in any accredited college, but the third year must be taken in the College of Science, Literature, and the Arts of this University. All three years of college work may be taken before entering the Law School, or two years before entering the Law School, and the third year after the completion of one year or more of law work. The latter plan enables the student to select college work in which he may become interested during his law course.

Students in this combined course must, before transferring to the Law School, complete the requirements for admission to the Senior College of the College of Science, Literature, and the Arts, stated in the bulletin of that college, and satisfy all the regulations which govern the work of other Arts College students. These requirements include a foreign language and a natural science. The student must secure at least 90 credits with an average of at least one honor point on all work done. He must also secure, either before entering the Law School or after completing one year or more of the law course, 45 additional college credits, of which at least 30 must be of Senior College grade, with an average of at least one honor point per credit. This third year of work must be approved by the assistant dean for the Senior College of the College of Science, Literature, and the Arts. In order to satisfy the requirements for the degree of bachelor of laws, the three years of college work must also include the subjects specified above for the prelaw course (or substitutes approved by the dean of the Law School).

The degree of bachelor of arts is conferred when the 135 credits of college work specified above and at least the first year of the course in the Law School are completed. The degree of bachelor of laws is conferred when the work of all seven years is completed.

COMBINED COURSE IN BUSINESS ADMINISTRATION AND LAW LEADING TO  
THE DEGREES OF BACHELOR OF BUSINESS ADMINISTRATION  
AND BACHELOR OF LAWS

This program consists of two years of prelaw and prebusiness work as specified below, approximately one and one-half years in the School of Business Administration instead of the full two-year program, and three and one-half years in the Law School instead of the full four-year program, thus qualifying for both the bachelor of business administration and the bachelor of laws degrees in seven years.

The prelaw and prebusiness work must amount to 90 credits, exclusive of quality credits, and shall include the regular prelaw course except Economics 27 and in addition Economics 5 (Elements of Statistics) and Economics 20, 25-26 (Elements and Principles of Accounting).

There are two options for the remaining five years:

- A. The third year exclusively in the Law School and the fourth year exclusively in the School of Business Administration, or vice versa. The fifth and sixth years exclusively in the Law School and the seventh year to be divided between the two schools, approximately half of the program being in each school.
- B. The distribution of both the business and law course throughout the five-year program.

The course requirements in Business Administration include the general core group courses exclusive of Business Law, B.A. 51-52-53; and Report Writing, B.A. 87. This amounts to a total of 36 credits. Substitutes such as Econ. 185 for B.A. 77, B.A. 184 for B.A. 89, Econ. 172 for B.A. 71 may be made with the approval of an adviser. The remaining courses—approximately 32 credits—may be elected from the Senior College courses in economics and business administration with the approval of an adviser.

The course requirements in the Law School include all the courses of the first and second years, the required courses of the third and fourth years, and electives sufficient with the required courses to make a total of approximately 68 credits in those years.

Students will be registered for the joint program in the Law School and the School of Business Administration throughout the five-year period. Their programs will be subject to approval of an adviser from the Law School and an adviser from the School of Business Administration.

#### ADVANCED STANDING

No credit is given for time spent in private reading or for study in a law office. The candidate for graduation must spend the required time in residence, either at this Law School or at some other school which is a member of the Association of American Law Schools. A student coming from such other law school must have the preliminary education required for admission to this school and must spend at least one year in attendance at this school before he can qualify for a degree. Advanced standing will be given only to students with satisfactory records, and credit may be withdrawn because of poor work in this school. Candidates should forward a transcript of their record in both prelaw and law work.

#### ELECTIVES IN OTHER DEPARTMENTS OF THE UNIVERSITY

Students in the Law School may be permitted, after completion of the work of the first year, and under proper regulations to elect, without extra charge, courses offered in other departments of the University, provided that such election does not interfere with their law studies; but such election of courses in other departments may be made only with permission of the law faculty.

#### REGISTRATION

New students will be admitted only at the opening of the school year.\* All students should register on or before the registration period stated in the university calendar. Lectures in all subjects begin promptly on the opening day of the term, and those who join their classes later will necessarily be seriously handicapped in their work. No student will be admitted to classes unless he registers within ten days after the opening of the year, except by special action of the faculty and for good cause shown.

#### EXPENSES

Careful estimates of the expenses of a student attending the Law School, together with other general information useful to students, are to be found in the Bulletin of General Information, to be had upon application to the director of admissions and records of the University. The estimated expenses of a law student who is a resident of Minnesota, are approximately \$600 per year.

\* See Bulletin of General Information, page 58, for the provisions as to privilege fees for late registration.

## THE LAW SCHOOL

## FEES

## All university fees subject to modification without notice

Quarterly resident tuition fee .....	\$42.00
Quarterly nonresident tuition fee .....	69.00
Credit hour fee (resident) .....	3.75
Credit hour fee (nonresident) .....	6.00
Quarterly incidental fee .....	8.50
Deposit fee (first quarter only).....	10.00
Special fees	
Examination for removal of conditions .....	1.00
Special examination .....	5.00
Graduation fee .....	7.50
Large diploma fee.....	5.00

## LOAN FUNDS

Loans not exceeding \$200 in any one year are available to law students of good character and scholarship from the following funds:

*Frank B. Kellogg Loan Fund.*—A bequest of \$25,000 by the late Frank B. Kellogg.

*Law Alumni Loan Fund.*—Approximately \$25,000 donated by alumni and friends of the Law School.

*Law Faculty Loan Fund.*—Approximately \$5,000 donated by members of the Law School faculty.

## MILITARY AND NAVAL SCIENCE AND TACTICS

Attention is called to the courses in Military Science and Tactics and Naval Science and Tactics described in the Bulletin of General Information. These courses are open to students in the Law School.

## INQUIRIES

Further particulars as to any phase of the work of the Law School not given herein, or in the Bulletin of General Information, will be cheerfully given upon request. Communications addressed to the dean of the Law School of the University of Minnesota, Minneapolis, Minnesota, will receive prompt attention.

## COURSES OF STUDY AND DEGREES

The Law School offers courses leading to the degree of bachelor of science in law and the degree of bachelor of laws.

The course for the degree of bachelor of science in law is two years. To be admitted as a candidate for this degree a student must have completed two years (90 quarter, 60 semester credits) of college work, with the requisite honor points (see Admission). The college work is elective. No foreign language is required. The prebusiness course in this University will satisfy the college requirement. The law work may be either the regular first two years of the professional course, or selected law work for those who wish training only for business purposes. The degree of bachelor of science in law is conferred upon those candidates who maintain an average of at least 70 in the work of each of the two years in the Law School. This degree does not qualify for admission to the bar, but students who have completed this course may go on to the bachelor of laws degree upon the conditions stated in the next paragraph.

The course for the degree of bachelor of laws—the professional degree required for practice—requires two additional years of study in the Law School. To be admitted as a candidate for this degree, a student must have completed the college work required for the degree of bachelor of science in law, including, except in the case of students who have a college degree when they begin the study of law, the subjects specified in the prelaw course (or substitutes approved by the dean of the Law School) and must also have completed the two years of law work required for the degree of bachelor of science in law with an average of not less than 75 in one of those two years, or of not less than 73 for all the work of those two years combined. The additional two years of study in the Law School are devoted to advanced vocational and professional courses. Approximately one half of the work of these two years is prescribed, including practice, pleading, evidence, judicial administration, and legislation. The other half of the work is elective. Students are permitted to take some work in other departments of the University. Advanced courses in political science and economics are especially recommended. The course is designed to give a broad view of law and legal institutions, and to train the student not only to care for clients' interests, but also for public service in his profession and for public and legislative leadership.

A three-year course leading to the degree of bachelor of laws is available to candidates who have a bachelor of arts or equivalent degree when they begin the study of law. The subjects listed in the prelaw course are strongly recommended for the college course, but no specific college subjects are required. The work of the first two years of the law course is the same in both courses. The averages required to be eligible to go on to the third year are those above stated. Practice, pleading, and evidence are required in the third year; other subjects are elective, but restricted to the Law School.

A course leading to the degree of master of laws may be taken under the direction of the Graduate School of the University. Candidates must have completed two years of college work, and the work required for the bachelor of laws degree in a school which is a member of the Association of American Law Schools. No specific course of study is required, but the course elected must be approved by an adviser. Subjects in the curriculum of the Law School not counted towards the first degree and additional work in subjects already studied may be elected. The candidate may also elect studies in the social sciences in the College of Science,

Literature, and the Arts, and in the School of Business Administration. The candidate must complete 24 quarter credits of classroom work and prepare a thesis that will be accepted for publication in the *Minnesota Law Review*. The course may be shaped to secure a more extensive survey of the law and related subjects, or to give a more thoro training in some special branch.

### GENERAL RULES

Students, unless they be of exceptional ability and industry, who find it necessary to devote a considerable portion of their time and energy to work not connected with their law studies, are strongly advised to limit their work in the Law School to not more than ten hours in the classroom per week, and thus extend their study of law over a longer period.

No student, unless permitted by special action of the faculty, will be allowed to carry more than the regular prescribed work for the year, or proportional work for any term.

Attendance upon all special lectures scheduled is required; and all students in the Law School may be required to serve as jurors or witnesses in any proceedings before the practice court.

All the courses offered by the Law School are given between the hours of 8:30 a.m. and 5:30 p.m.

A student who is absent from the school two consecutive years must satisfy the requirements in force when he returns.

### FIRST YEAR SUBJECTS

Agency. Mathews, *Cases on Agency and Partnership*. Two hours. Mr. Kinyon.  
 Common Law Actions and Equity I. McBaine, *Cases on Common Law Pleading*;  
 McClintock, *Cases on Equity*. Two hours. Mr. Pirsig.  
 Contracts. Williston, *Cases on Contracts* (4th ed.). Three hours. Mr. Read.  
 Criminal Law. Hall and Glueck, *Cases on Criminal Law*. Two hours. Mr. McClintock.  
 Property I. Introduction to real and personal property. Fraser, *Cases on Property*, Vols. I and II. Three hours. Mr. Fraser.  
 Torts. Bohlen, *Cases on Torts* (3rd ed.). Three hours. Mr. Prosser.

### SECOND YEAR SUBJECTS

Banking and Negotiable Paper. Aigler, *Cases on Negotiable Paper and Banking*.  
 Two hours. Mr. Kinyon.  
 Briefmaking. One hour. Mr. Cherry, Mr. Pulling.  
 Constitutional Law. Casebook to be announced. Two hours. Mr. Rottschaefer.  
 Equity II. McClintock, *Cases on Equity*. Two hours. Mr. McClintock.  
 Private Corporations. Ballantine and Lattin, *Cases and Materials on the Law of Corporations*. Two hours. Mr. Jennings.  
 Property II. Fraser, *Cases on Property*, Vol. II; Kirkwood, *Cases on Conveyances*. Two hours. Mr. Bade.  
 Sales. Williston and McCurdy, *Cases on Sales*. Two hours. Mr. Prosser.  
 Trusts. Scott, *Cases on Trusts* (2nd ed.). Two hours. Mr. Bade.



## THIRD AND FOURTH YEAR SUBJECTS

(45 credits each year)

- Accounting and Federal Income Taxation. Graham and Katz, *Accounting in Law Practice* (2nd ed.); Rottschaefer, *Cases on Taxation* (2nd ed.). This course covers the system of federal income taxation and those fundamental principles of accounting related thereto and useful in interpreting corporate balance sheets and income statements. Three hours, half year. Mr. Rottschaefer.
- Administrative Law. Gelhorn, *Cases*. Nature and scope of administrative action in relation to constitutional limitations; administrative law making; methods, procedures, and judicial review of federal and state administrative tribunals in relation to such individualized problems as control of aliens, public officers, pardons, postal regulation, public utility and business regulation, taxation, and workmen's compensation. Two hours. Mr. Jennings.
- Conflict of Laws. Cheatham, Dowling, and Goodrich, *Cases on Conflict of Laws*. Two hours. Mr. Read.
- Creditors' Rights. Hanna and McLaughlin, *Cases on Creditors' Rights*. The course deals principally with remedies of unsecured creditors covering execution of judgment, attachment and garnishment, proceedings supplementary to execution and creditors' bills, fraudulent conveyances, creditors' agreements, receiverships and bankruptcy. Special attention will be given to the reorganization of corporations under the modern statutes. Two hours. Mr. Riesenfeld.
- Damages. Beale, *Cases on Damages* (3rd ed.). Two hours, half year.
- Equity III and Quasi-Contracts. Durfee and Dawson, *Cases on Remedies*, Vol. II: *Restitution at Law and in Equity*. Two hours, half year. Mr. Jennings.
- Evidence. McCormick, *Cases on Evidence*. Two hours. Mr. Cherry.
- Federal Jurisdiction. Dobie and Ladd, *Cases and Materials on Federal Jurisdiction and Procedure*. Two hours, half year. Mr. Jennings.
- Insurance. Vance, *Cases on Insurance* (3rd ed.). Two hours, half year. Mr. Kinyon.
- Judicial Administration. A study of the function and method of judicial administration, the organization of courts, the selection of judges, qualifications and organization of the legal profession, the jury, problems of procedure, and reforms adopted and advocated. Mimeographed material. Two hours. Mr. Pirsig.
- Jurisprudence. The subject matter of this course will include theories of law and of justice, relation of law and social sciences, general methods of legal reasoning, and general conceptions employed in legal analysis. Hall, *Readings in Jurisprudence*. Two hours. Mr. Rottschaefer.
- Labor Law. Landis, *Cases on Labor Law* (2nd ed.). Two hours, half year. Mr. McClintock.
- Legal Ethics. Costigan, *Cases on Legal Ethics*. One hour, half year. Mr. Pirsig.
- Legislation. Agencies, content, and province of legislation; relation to common law; preparation and drafting; sanctions; interpretation. Mimeographed material. Two hours. Mr. Read.
- Modern Philosophies of Social Reform. A review of the principal ideas which have been used as the basis for social criticism and reform since the close of the eighteenth century. There are five topics: the argument for democracy; the argument for laissez-faire; the critics of laissez-faire; the argument for revolution; the critics of revolution. The positive topics center in the doctrines of Jeremy Bentham, Adam Smith, and Karl Marx. The critical topics bring

- together the ideas of those thinkers who have been opposed to the trends set going by Bentham, Smith, Marx, and their respective followers. Wagner, *Social Reformers*. Two hours, half year. Mr. Castell.
- Modern Social Legislation. The course is designed to acquaint the student with legal developments made to meet the needs of modern society. Recent social security, housing, labor, and agricultural legislation in America will be studied as well as other measures for the conservation, distribution, and development of the national resources. Special attention will be given to procedures for the accomplishment of these ends, and foreign experiences will be discussed where they seem helpful. Assigned readings. Two hours. Mr. Riesenfeld.
- Mortgages. Campbell, *Cases on Mortgages*. Two hours, half year. Mr. Bade.
- Municipal Corporations. Tooke, *Cases on Municipal Corporations* (1931 ed.). Two hours, half year.
- Partnership. Crane and Magruder, *Cases on Partnership*. Two hours, half year.
- Pleading. Clark, *Cases on Pleading and Procedure* (one-vol. ed.). Two hours. Mr. Pirsig.
- Practice and Practice Court. McBaine, *Cases on Trial Practice* (2nd ed.). This course provides experience in the preparation and trial of cases in the practice court and the preparation of papers commonly used in litigation both trial and appellate. Students serve as assistants in the office of the Legal Aid Society. Three hours (five credits). Mr. Cherry, Mr. Bonner, Mr. Carroll, Mr. Bachelder, Mr. DeMouly.
- Property III. Future interests at common law and under Minnesota statutes. Simes, *Cases on Future Interests*, and assigned cases. Two hours, half year. Mr. Fraser.
- Psychology and Law. Burt, *Legal Psychology*. An attempt to investigate the overlap between the fields of psychology and law with special emphasis on the topics of individual differences, perception, and memory in testimony, abnormal behavior, detection of guilt, and other more general contributions of psychology. Two hours, half year.
- Public Utilities. Robinson, *Cases on Public Utilities*. Two hours, half year.
- Security Transactions. The course deals with the law of suretyship and other security devices except the real estate mortgage. Mortgages should be taken before this course. Security Transactions should be taken before Creditors' Rights. Hanna, *Cases on Security Transactions* (2nd ed.). Two hours, half year. Mr. Riesenfeld.
- Taxation. Rottschaefer, *Cases on Taxation* (2nd ed.). Two hours, half year. Mr. Rottschaefer.
- Trade Regulation. Oppenheim, *Cases on Trade Regulation*. Two hours, half year. Mr. McClintock.
- Wills. Costigan, *Cases on Wills* (2nd ed.). Two hours, half year. Mr. Bade.

**Tutorial courses.**—Students may arrange for tutorial courses in many of the subjects of the curriculum by consulting with the instructor in the subject chosen. Such a course may be substituted for one of the regular courses listed.

**Seminar courses.**—Seminar courses may be arranged in several fields of study if a sufficient number of students request them. Students should consult instructors in the field in which they are interested. Such a course may be substituted for one of the courses listed.

Students in their third and fourth years may elect, with the approval of the dean, not exceeding 21 credits of work in other departments of the University. Among the courses recommended are Local Government, Public Administration, Recent Political Thought, International Law, International Organization, Competition and Monopoly in Modern Industry, Comparative Economic Systems, Business Cycles, Labor Problems and Trade Unionism, Corporation Finance, Public Utilities, Criminology, and other advanced courses in political science and economics.

## ATTENDANCE FOR 1940-1941

First year class .....	108
Second year class .....	72
Third year class .....	61
Fourth year class .....	49
	<hr/>
Total .....	290

*The Bulletin of the*  
UNIVERSITY of MINNESOTA

**Special Notice**

Regarding University Fees, 1941-1942

**Superseding General Information**  
and  
**Other Bulletin Announcements**

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Volume XLIV, Number 40

June 26, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

# UNIVERSITY FEES

The following tuition fees have been approved by the Board of Regents, effective fall quarter 1941.

## TUITION FEES

School or College	Quarter Fee		Credit Hour Fee*	
	Resident	Nonresident	Resident	Nonresident
General College .....	\$25.00	\$50.00	¶	¶
Science, Literature, and the Arts.....	25.00	50.00	\$2.25	\$4.50
Agriculture, Forestry, and Home Economics	25.00	50.00	2.25	4.50
Public Health Nursing .....	25.00	50.00	2.25	4.50
Public Health .....	25.00	50.00	2.25	4.50
Education .....	25.00	50.00	2.25	4.50
Graduate School .....	‡32.00	‡50.00	‡2.75	‡4.50
Institute of Technology .....	32.00	50.00	2.75	4.50
Law School .....	42.00	69.00	3.75	6.00
Medical School and Clinical Graduate Work	77.00	129.00	\$3.50	\$6.00
Medical Technology .....	42.00	64.00	\$3.25	\$5.00
Physical Therapy .....	42.00	64.00	\$3.25	\$5.00
Nursing .....	27.00	50.00	\$1.25	\$2.25
Dentistry .....	62.00	84.00	\$2.75	\$3.75
Dental Hygiene .....	27.00	50.00	2.25	4.00
Pharmacy .....	37.00	54.00	‡1.75	‡2.50
Business Administration .....	32.00	50.00	2.75	4.50
Library Instruction .....	42.00	54.00	3.25	4.50
University College .....	Tuition of college in which work is taken			

\* Students carrying less than the complete schedule of work may pay fees on a credit hour basis.

† Prorating in this college is on the basis of clock hours except for academic courses for which the fee is \$3.50 per credit hour for residents and \$5.00 per credit hour for nonresidents.

‡ All fellows, scholars, assistants, instructors, and members of the teaching staff and scientific bureaus and experiment stations giving 25 per cent or more of full-time service when regularly enrolled as students in the Graduate School shall not be required to pay tuition fees. This does not apply to commercial fellowships.

§ In these colleges the prorating is on the basis of clock hours.

¶ Part-time students shall be charged tuition prorated on the basis of full-time work, plus one third.

Special students in the General College shall be charged a quarter course fee, residents \$10, nonresidents \$15. Special students include those not regularly matriculated, or those who have received a Bachelor's degree or its equivalent, or those registered for two courses or less in any quarter and not enrolled for other work in the University.

## INCIDENTAL FEE

An incidental fee of \$8.50 a quarter is charged each student for which the student receives the privileges of the Coffman Memorial Union, the Health Service, the Testing Bureau, the *Minnesota Daily*, including the Official Daily Bulletin, the university post-office service, and the *University Address Book*. Students in the Institute of Technology pay \$8.90 per quarter and receive the *Minnesota Techno-Log* in addition to the foregoing.

All students who are registered for five credits or more in any quarter shall be required to pay the regular incidental fee; while students who are registered for less than five credits in any quarter shall not be charged any incidental fee, nor be permitted to pay this fee in order to obtain the privileges to which the payment of this fee entitles students.

## MATRICULATION DEPOSIT

At the student's first registration at the University a matriculation deposit of ten dollars (\$10) is required to cover the following charges: locker rental, locker key deposit, case book deposit (Law School), laboratory breakages, drawing board rental (Architecture), military equipment deposit (men), library fines, or damage to university property.

The matriculation deposit required of students registered for less than five credits is five dollars (\$5), whereas the matriculation deposit of students registered in the Graduate School is three dollars (\$3).

The unused balance of the deposit fee will be returned by *mail* upon cancellation or automatically after the beginning of the first quarter the student fails to return. If, at any time, the charges against a student shall warrant a renewal of the deposit, an additional fee of five dollars (\$5) will be required.

**Laboratory deposit.**—A laboratory deposit of five dollars (\$5) is also required of students registered for courses in chemistry to cover the cost of materials. The unused balance will be credited to the student's matriculation deposit at the end of the course.

## SPECIAL FEES

Examination of credentials fee (nonresidents applying for admission to Law, Medicine, Dentistry, Education (Senior College), and Business Administration) ..... \$5.00

This fee is not refundable but may be applied toward tuition within one year of date of application.

Music fee (in addition to tuition for those electing music)

### Lesson fees—

One individual lesson per week..... \$25.00 per quarter

Class lessons (two- or three-hour lesson)..... 15.00 per quarter

**Practice fees** ..... 5.00 per quarter

Pianos and organs are available for practice purposes upon payment of practice fees charged by the Music Department.

Directed teaching fee.....\$1.00 per credit hour

Laboratory fees—for individual courses. The amounts are specified in the course announcements.

Aeronautical Engineering Laboratory fee (required of sophomores, juniors, and seniors in Aero. Eng.)..... \$3.00 per quarter

Gymnasium fee (required of all men taking exercise courses in Physical Education) ..... \$1.00 per quarter

Gymnasium fee (required of all women taking exercise courses in Physical Education) .....	\$1.75 per quarter
(Maximum charge for one quarter is \$3.50)	
The following special items may be included:	
Condition examination .....	\$1.00
Special examination for removal of condition, at other than set time* .....	5.00
Examination on subjects taken out of class* .....	5.00
(No fee for such examination on first entering the University, if taken within the first six weeks)	
Large diploma fee: any graduate may receive the large diploma on payment of the special fee of .....	5.00
Duplicate diploma (if original has been lost or destroyed)	
Large duplicate diploma .....	7.50
Small duplicate diploma .....	5.00
Duplicate copy of record: one copy of record will be issued to each student free of charge. Each additional copy will be issued only on payment of ....	0.50
(Except during a registration period, when the fee is \$1.00)	
Transcript fee—Three transcripts of record will be sent without charge to other institutions for purposes of transfer, to certifying agencies, or to prospective employers. For additional transcripts, each .....	
Graduation fee—Graduate School .....	10.00
Other schools and colleges .....	7.50

\* Such an examination may be taken only upon approval of the appropriate committee.

### INFORMATION

The university year, extending from October to June, is divided into three terms called quarters. On the specified dates (see Calendar, pp. 51-53, General Information Bulletin) prior to the opening of each quarter, the following fees are due from each student: (a) tuition, (b) incidental, and (c) such special fees and deposits as may be required.

Payment of fees cannot be deferred. Special attention is called to the paragraph on Privilege Fees (page 58, General Information Bulletin) for further instruction on late registration and late payments of fees.

Checks and drafts received in payment of any fee whatsoever are accepted subject to final payment in cash or solvent credits; and all banks in the banking routine of collection of such items are accepted by the student as his own agents, and not those of the University, whether such items be sent directly or indirectly to the payer bank.

# *The Bulletin of the* UNIVERSITY of MINNESOTA

Course in Medical Technology  
1941-1942

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Volume XLIV, Number 41

July 3, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*



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Gerald T. Evans, M.D., C.M., Ph.D., Director of the Course in Medical Technology  
Charlotte M. Gast, B.A., M.D., Assistant Director of the Course in Medical Technology

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- Asa J. Carter, R.T., Chief Technologist in Radiography
- Zora Dragich, B.S., Technologist in charge, Bacteriology Laboratory
- Mary Ryan, Technologist in charge, Dispensary Laboratory
- , Technologist in charge, Metabolism and Electrocardiography
- Doris Doeden, B.S., Technologist in Chemistry
- Erika Rogalsky, B.S., Technologist in Chemistry
- Dolores Tuberg, B.S., Technologist in Bacteriology
- , Technologist in Hematology

## GENERAL INFORMATION

The Course in Medical Technology is a four-year course and leads to the degree, bachelor of science. No short course is given. The first two years are spent in the College of Science, Literature, and the Arts. At the beginning of the third year the student transfers her registration to the Medical School and completes all theoretical work. The entire fourth year of twelve months is spent in a practical rotating service in the laboratories of the University of Minnesota Hospitals and affiliated hospitals. An additional six months for training in X-ray technique may be elected by the student.

A course in X-ray technology is being organized. It will be a four-year course leading to the degree, bachelor of science. The curriculum will include three years of theoretical courses, and an entire fourth year of twelve months of practical training and experience in radiography and technical phases of therapy in hospital X-ray laboratories. It will not include any consideration of, nor instruction in, medical laboratory procedures. Further information will be published in a separate bulletin, which may be obtained from the admissions and records office after January 1, 1942. Before that time address inquiries to Dr. Leo Rigler, Director of X-ray Department, University of Minnesota Hospitals, Minneapolis, Minnesota.

## HISTORICAL STATEMENT

The University of Minnesota was one of the first universities to confer a degree for a sequence of courses pertaining to medical technology. The first bulletin was published March 10, 1922, with the title "Courses in Medical Technology for Clinical and Laboratory Technicians." The first graduate received her degree in March, 1923, and since that time to April 15, 1941, there have been 399 graduates.

The course was organized under the direction of Dr. Richard Olding Beard. It has always consisted of four years of college work with credit given for practical work in the hospital laboratories during the fourth year. In the beginning the major part of the special training was obtained by taking courses in anatomy, physiology, pathology, and medicine. In 1929, the first program of rotation through the various laboratories, with a definite amount of time spent in each, was established. By 1932, the schedule provided for twelve months of full-time work in the laboratories which included four months in X ray. In September, 1938, the schedule was changed to an entire twelve months in the medical laboratories and an additional six months in X ray. In September, 1939, the training in X ray was lengthened to nine months and made optional.

After the retirement of Dr. Beard in 1925, the course was under the supervision of a special committee of representatives of the Graduate School and the Medical School of which Dr. William A. O'Brien was chairman. In May, 1940, Dr. Gerald T. Evans, director of the laboratory service of the University Hospitals, was appointed director of the Course in Medical Technology.

## TRAINING

A medical technologist is trained in the performance of various diagnostic procedures used by physicians. Her work includes chemical analyses of blood and urine, hematology, urinalysis, bacteriology, serology, electrocardiography, basal

metabolism, and the preparation of tissues for microscopic study. This work requires intelligence and reliability of high order. Advanced courses in chemistry and bacteriology are part of the training. As a general rule, a student who has excelled in scientific subjects in high school will succeed in medical technology.

### EMPLOYMENT

This broad training enables the graduate to qualify for positions requiring general or specialized laboratory experience in clinics, physicians' offices, and hospital laboratories. Training in X-ray technique is necessary to meet the requirements for approximately 80 per cent of the positions. In larger hospitals where there are several technologists, one may be occupied principally or entirely with hematology, bacteriology, chemistry, or X ray. There are opportunities for those who have the proper training and sufficient ability to work in research laboratories associated with larger clinics, foundations, and universities. Such positions either require or involve specialization or graduate study. The course in medical technology is a desirable preliminary to graduate work in hematology, bacteriology, or physiological chemistry, and has a general educational value in the biological sciences.

### ADMISSION TO FRESHMAN CLASS

The requirements for admission are the same as those for admission to the College of Science, Literature, and the Arts. For complete information consult the Bulletin of General Information. Graduates of accredited high schools may enter at the beginning of any quarter, but the curriculum outlined is based on entrance in the fall quarter. If a student enters at any other quarter, it may be necessary for her to take some work during the summer sessions or to wait until certain courses are given.

No specific subjects are required. Since the units offered to meet language requirements in Group B can also be used for credit in continuation of a language, it is advised that students take a minimum of two, or preferably three, years of one language, to be continued at the University. Furthermore, it is advised that students who might study medicine or take other graduate work should take German. It is suggested that chemistry be taken in high school. A student who does not take any courses in X ray may be exempt from physics by satisfactorily passing a placement test after having had high school physics.

### ADMISSION WITH ADVANCED STANDING

Students who have taken courses of college grade in other institutions are allowed to transfer to the University of Minnesota to complete the Course in Medical Technology. Courses which are the equivalent of those given at the University of Minnesota in the Course in Medical Technology are accepted to satisfy the requirements of the course. If courses which are the equivalent of those required in the third year are offered for transfer the student will be admitted with advanced standing, and will be ready to start the senior practical work as soon as all remaining required courses are completed. In all except very unusual instances, it is necessary for every transfer student to spend one or more quarters at the University before she is ready to start senior practical work.

## ADMISSION TO THE JUNIOR CLASS

The number of students accepted into the junior class each year will depend upon the number of places available in the laboratories for practical experience during the senior year. The selection of students admitted is made on the basis of their scholastic standing during the first two years. In accordance with the policy of the University, residents of Minnesota are given preference. Nonresidents with satisfactory scholastic records are admitted whenever there are vacancies.

Application for admission to the last two years must be made by all students, including those registered the first two years at the University of Minnesota. All applications should be filed with the director of admissions by June 5. Applications received after July 1 will be considered only if the class is not complete. Selection of all students to be admitted each year is made only once a year—in July—and applicants are notified shortly thereafter. Accepted students will receive a statement for a preliminary fee of ten dollars (\$10) in order to reserve their places in the class. This must be paid within ten days after notification of acceptance. This preliminary deposit is not refundable but will be applied on the tuition provided the applicant enters at the time specified.

All courses listed in this bulletin as requirements for the first two years must be completed before the student is admitted to the junior year. However, those students who expect to complete these requirements before or during the following winter quarter must file their application by June 5. In some instances, students transferring from other colleges may be able to make up their deficiencies, such as bacteriology and histology, by attending Summer Session classes. This would make them eligible for admission to the special medical technology courses as much as one year earlier than would be possible otherwise. It is strongly advised that transfer students ascertain their status by writing to Dr. Charlotte M. Gast, assistant director of the course, 136 Medical Sciences, before May 1 so that, if necessary, they may take courses during the Summer Session. However, this will not insure their acceptance into the Course in Medical Technology, as all applications must be considered together after July 1.

## REGISTRATION

All prospective students are urged to consult Dr. Charlotte M. Gast, assistant director of the course and special adviser, in the Medical School office, 136 Medical Sciences. This should be done in person if possible. During the first year, advisers in the Junior College office, 106 Folwell Hall, may be consulted. During Freshman Week, each freshman should also register in the Medical School office, so that she will receive special notices for medical technologists, be eligible to vote for a class representative to the Medical Technology Council, and be informed of the extracurricular activities of the medical technologists. After the freshman year, each student must submit her registration to the assistant director for approval.

## SCHOLARSHIP

Before admission to the junior year of the Course in Medical Technology the student must have earned 90 credits and 90 honor points (an average of one honor point per credit, which is a "C" average), and have completed the courses, or their equivalents, required in the first two years of the course. For each five honor points in excess of one honor point per credit, the number 90 is diminished by one. The total number of honor points in the following required subjects must

at least equal the total number of credits in those courses: English, chemistry, physics, zoology, anatomy, histology, and bacteriology.

The requirements for graduation are the completion of all the required courses, or their equivalent, the completion of the practical work, and a total of 180 credits and 180 honor points, an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, not including those received for practical work, the number 180 is diminished by one.) The total number of honor points in the courses required in the last two years, in chemistry, bacteriology, physiology, parasitology, hematology, and medical technology must at least equal the total number of credits in those courses. Honor points received from grades in practical work (Med. Tech. 52 and 102) cannot be used to make up a deficit of honor points in theoretical work.

#### DEGREES

Upon satisfactory completion of the prescribed course, the degree, bachelor of science, will be conferred by the Board of Regents. Students completing the course with an average of two honor points for each credit may graduate "with distinction" upon recommendation of the Committee on Honors.

#### FEES

NOTE.—For complete information about fees, expenses, residence, consult the Bulletin of General Information.

#### **All university fees subject to modification without notice.**

During the first two years, the student is enrolled in the College of Science, Literature, and the Arts. The tuition for residents of the state of Minnesota is \$25 each quarter, that is, \$75 a year; for nonresidents, \$50 each quarter, or \$150 each year.

Upon completion of all courses as outlined for freshman and sophomore years, the student is transferred to the Course in Medical Technology. During the junior and senior years the tuition is \$42 each quarter for residents and \$64 each quarter for nonresidents. During the fourth year the student is given instruction and training for four quarters (twelve months) but pays tuition for only three quarters. No tuition is charged for the six months of practical training in X ray when it is taken in conjunction with the Course in Medical Technology.

In addition there is a matriculation deposit of \$10 payable with the first registration only, and an incidental fee of \$8.50 a quarter for which the student receives the privileges of the Health Service, Testing Bureau, Coffman Memorial Union, and university post-office service, the *Minnesota Daily* including the Official Daily Bulletin, and the *University Address Book*. Laboratory deposits are required from students taking science courses.

Medical Technology students do not live in the hospital, nor are they supplied with books, meals, or uniforms; these must be furnished by the students themselves.

#### EXPENSES

The average cost of room, board, and laundry is stated in the Bulletin of General Information as \$402 a year. This does not include books, tuition, laboratory fees, clothes, or traveling expenses. The average cost of books for the first year is \$35. Students do not need to purchase special instruments. Microscopes are rented for the duration of courses in which they are used.

## RESIDENCES

Two residence halls for women, Ada L. Comstock Hall and Sanford Hall, provide accommodations for 523 students. There are numerous off-campus residences approved by the University which offer satisfactory arrangements for rooms and meals. Nine co-operative cottages, each in charge of a chaperon, offer comfortable homes for about 115 women. By assisting with the work of the houses, the students are able to keep expenses under \$25 a month per person.

## STUDENT AID

The University offers some opportunities to those who need assistance in meeting the expenses of their education and who have shown through good scholarship in the University that such aid is warranted.

The various types of aids are classified as fellowships, scholarships, prizes, loan funds, and the Employment Bureau. For full information concerning these aids write to the office of admissions and records for the bulletin University Aids for Student Expenses. In general, all applications for loans should be made to the dean of students and all applications for scholarships for women should be made to the dean of women.

The University has no scholarships to offer entering freshmen. No student is eligible to borrow from any university loan fund until she has completed two quarters' work at the University of Minnesota.

The University maintains an Employment Bureau for the purpose of helping both men and women students who seek work, and of developing, in all proper ways, opportunities for self-help. It should be pointed out that each of the first three years of the Course in Medical Technology includes several courses which require many hours of work in the laboratory, and it is advised that only students who are proficient in their studies should attempt to do part-time work. During the fourth year, the practical work requires as much time as a full-time position and no student should arrange for outside or part-time work that will interfere with such a program.

# CURRICULUM

## FIRST TWO YEARS

The following courses or their equivalents must be completed before the student will be admitted to the junior year:

Eng. 4-5-6, Freshman Composition (9 cred.)

or

Eng. A-B-C, Freshman English (15 cred.) or exemption from the requirement

Chem. 1-2, or 4-5, General Inorganic (8 cred.)

Chem. 11, Qualitative Analysis (4 cred.)

Chem. 7, Quantitative Analysis (4 cred.)

Chem. 1-2, Elementary Organic Chemistry (8 cred.)

Zool. 1-2-3, General Zoology (10 cred.)

Zool. 21, Histology (5 cred.)

Anatomy 3, Elementary Human Anatomy (3 cred.)

Phys. General Physics. Minimum of 5 credits.

Bact. 53, General Bacteriology (5 cred.)

or

Bact. 101, Medical Bacteriology (5 cred.)

Electives to make a total of 90 credits for two years' work.

Comparative Anatomy 22 (5 cred.) may be substituted for Anatomy 3 by students who do not take any courses in X ray.

Phys. 1-2-3, Introduction to Physical Sciences (9 cred.) is required for all students taking any courses in X ray. It is advised for all students.

In some instances special permission will be granted to students who will not take any courses in X ray to substitute one unit of high school physics for the requirement. Students who do not substitute high school physics may meet the requirement by taking Introduction to Physical Science 1-2 (6 credits).

A student who might continue with the study of medicine should take Physics 4-5-6 (which has prerequisites in Mathematics) in order to meet the requirement for admission to the Medical School.

A student who might study medicine or take graduate work should take German in order to meet the requirements.

There is no essential limitation in the subjects which may be chosen as electives. However, since it would be unwise for a student to take a wide variety of elective courses without having proceeded beyond the first and most elementary courses in each, it is advised that in the first two years the student elect introductory courses in subjects she expects to continue in her junior year. Courses in social sciences are recommended. It is also advised that the student include two years of study of a foreign language in her high school curriculum and that she continue that language at the University for at least two quarters, so that she will have the equivalent of 20 college credits. (For example: 2 years of high school German and German 3-4 [10 cred.] is the equivalent of German 1-2-3-4 in college.)

A program which includes only scattered electives will not be approved.

Recommended electives are listed on page 11.

NOTE.—English, chemistry, zoology, and anatomy should be taken in the freshman year.

## JUNIOR AND SENIOR YEARS

In order to meet the requirements for graduation, the following courses must be completed, in addition to those required for admission to the junior year:

Chem. 100-101, Physiological Chemistry (13 cred.)

Physiol. 60, Human Physiology (6 cred.)



Bact. 102, Medical Bacteriology (4 cred.)  
 Bact. 116, Immunity (3 cred.)  
 Zool. 51, Introductory Animal Parasitology (5 cred.)  
 Anat. 165, Hematology (4 cred.)  
 Med. Tech. 51, Introduction to Medical Technology (5 cred.)  
 Med. Tech. 52, Junior Practical Work (3 cred.)  
 Med. Tech. 101, Methods and Clinical Orientation (6 cred.)  
 Med. Tech. 102, Senior Practical Work (40 cred.)  
 Electives to make a total of 180 credits for four years' work.

Students who do not take the X-ray practical work may take courses in X-ray physics and technique as electives.

Students who take X-ray practical work will be required to take courses X-ray Physics 51 (2 cred.) and X-ray Technique 52 (2 credits).

All programs made up after September 30, 1941, must provide for the completion of all theoretical courses, except Medical Technology 101, before the student begins the senior practical work, Medical Technology 102.

Students admitted as juniors the fall of 1941 or later, are eligible to elect six months of practical training in X ray.

Electives suggested for medical technologists:

Bact. 114, Molds, Yeasts, Actinomycetes  
 Bact. 153, Hospital Bacteriology  
 Comp. 27,28,29, Advanced Writing  
 Draw. and Des. Geom. 44, Lettering  
 Eng. 37,38,39, Twentieth-Century Literature  
     and other courses in Literature  
 Econ. 1, Introduction to Economics  
 Econ. 6-7, Principles of Economics  
 Econ. 82, Competition and Monopoly in Modern Industry  
 Econ. 83, The Inequality of Incomes  
 Econ. 84, Comparative Economic Systems  
 Fine Arts 1,2,3, Introduction to Art  
 Hist. 17, Social and Economic History of Modern Europe  
 Lib. Meth. 1, Use of Books and Library  
 Lib. Meth. 79, Medical Reference  
 Math. 1, Higher Algebra  
 Math. 6, Trigonometry  
 Math. 7, College Algebra  
 Math. 15-16, Elementary Mathematical Analysis  
 Mus. 31-32-33, Music Appreciation  
 Orient. 1-2-3 or 4-5, Man in Nature and Society  
 Phil. 2f-1w-3s, Logic, Problems of Philosophy, Ethics  
 Phil. 20, Social Philosophy  
 Pol. Sci. 1-2-3, American Government and Politics  
 Pol. Sci. 7, Comparative European Governments  
 Pol. Sci. 15, Elements of Political Science  
 Pol. Sci. 17, Tutorial Work  
 Pol. Sci. 25, World Politics  
 P.M.&P.H. 3, Personal Health  
 P.M.&P.H. 50, Public and Personal Health  
 Psy. 1-2, General Psychology  
 Psy. 3, Psychology Applied to Daily Life  
 Psy. 114, Human Behavior  
 Soc. 1, Introduction to Sociology  
 Soc. 6, Social Interaction  
 Soc. 100, Social Psychology  
 Soc. 101, Social Organization  
 Soc. 120, Social Life and Cultural Change  
 Sp. 1-2-3, Fundamentals of Speech  
 Zool. 75, Nature Study  
 Zool. 82, Evolution  
 Zool. 83, Introduction to Genetics and Eugenics

## DESCRIPTION OF COURSES\*

Other courses which are equivalent or more comprehensive may be substituted for the required courses. For such courses and other courses which may be taken as electives consult the Combined Class Schedule, which also contains information about rooms, hours of classes, and further details.

### ANATOMY

- 3f,s. Elementary Anatomy. (3 cred.; no prereq.)  
165f,su. Hematology. Normal and pathologic morphology of the blood, with special emphasis on the study of the blood from the standpoint of diagnosis and prognosis. (4 cred.; prereq. Zoology 21) Dr. Downey.  
166w. Hematology. Normal and pathologic morphology of the blood-forming organs. May be elected by medical technologists. Continuation of 165f. (4 cred.) Dr. Downey.

### BACTERIOLOGY

- 53f,w,s,su. General Bacteriology. (5 cred.; prereq. 10 cred. in chem. and 4 cred. in bot. or zool.)  
101w. Medical Bacteriology. (5 cred.; jr., sr., grad.; prereq. Zool. 1-2-3 and 10 cred. in chem.)  
102s,su. Medical Bacteriology. (4 cred.; jr., sr., grad.; prereq. 101)  
114s. Molds, Yeasts, and Actinomycetes. (4 cred.; jr., sr., grad.; prereq. 53 or 101) Dr. Henrici.  
116w,su. Immunity. (3 cred.; jr., sr., grad.; prereq. 53 or 101) Dr. Larson.  
120s. Diseases of Animals Transmissible to Man. (3 cred.; jr., sr., grad.; prereq. 102)  
121f-122w. Physiology of Bacteria. (6 cred.; jr., sr., grad.; prereq. Bact. 53 and 8 cred. in org. chem. or biochem.)  
153f,w,s. Hospital Bacteriology. (Cred. ar.; prereq. permission of chairman of dept.)

### CHEMISTRY

#### INORGANIC CHEMISTRY

- 1f-2w. General Inorganic Chemistry. (4 cred. per qtr.; no prereq.)  
4f-5w. General Inorganic Chemistry. (8 cred.; primarily for preidental and medical technology students; prereq. entrance cred. in chem.)

#### ANALYTICAL CHEMISTRY

- 11s. Qualitative Chemical Analysis. (4 cred.; for premedical, preidental, and medical technology students; prereq. 2 or 5)  
7f. Quantitative Analysis. (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)

\* A course is designated under a department, by a number and a letter. It has the same number in whatever quarter it is offered. The quarter is designated by letter (f, fall; w, winter; s, spring; su, summer).

1f-2w-3s indicates a three-quarter course continued through the year

1f,w,s indicates a one-quarter course repeated each quarter

## ORGANIC CHEMISTRY

1f-2w. Elementary Organic Chemistry. (8 cred.; prereq. Inorg. Chem. 11)

## DRAWING AND DESCRIPTIVE GEOMETRY

41-42-43f,w,s. Technical Drawing. (a) General course in the theory and practice of freehand drawing. Principles of perspective, sketching, rendering, conventions, lettering, and industrial drawing. (b) Modification of the above course of particular interest to dental, medical, and scientific students. (6 cred.; all; no prereq.)

41f,w,s. Lettering. A practical course in plain lettering. (1 cred.; all; no prereq.)

86-87f,w,s. Anatomical Drawing. (3 cred. per qtr.; prereq. 43 or equiv.)

## ECONOMICS

1f. Introduction to Economics. (5 cred.; fr. only; no prereq.)

6f-7w. Principles of Economics. (10 cred.; soph., jr., sr.; no prereq.)

82f. Competition and Monopoly in Modern Industry. (3 cred.; jr., sr.; no prereq.)

83w. The Inequality of Incomes. (3 cred.; jr., sr.; prereq. Econ. 82)

84s. Comparative Economic Systems. (3 cred.; jr., sr.; prereq. Econ. 6-7 or 83)

## ENGLISH

**Important note.**—No student may register for any course in Freshman English without having taken a placement test. Assignment to a particular course in Freshman English will depend on the student's record in the placement test.

Freshman English is a 15-credit course consisting of 9 credits of literature and 6 credits of composition. Composition 4-5-6 is a 9-credit course in composition. Either course satisfies the requirement in English for graduation or for admission to the Senior College.

Af-Bw-Cs. Freshman English. (15 cred.; all; prereq. placement test)

4f-5w-6s. Freshman Composition. (9 cred.; all; prereq. placement test)

37f-38w-39s.† Twentieth-Century Literature. Readings in British and American literature since the 1890's, arranged by types of discourse—37f: The literature of opinion, biography, travel, etc., with some reading in the short story; 38w: Poetry and drama; 39s: The novel since Thomas Hardy. This course is intended as a general introduction to the intelligent reading of literature for students in all colleges and not particularly for those meaning to specialize in English. (9 cred.; soph., jr., sr.; prereq. English A-B-C or Composition 4-5-6 or exemption from requirement.) Mr. Conklin (f), Mr. Sanford (w), Mr. Beach (s).

## FINE ARTS

1f. Introduction to Art: Modern Art. Modern architecture, painting, and sculpture in Europe and America, with a critical analysis of the various schools, the theories and principal works of contemporary art. Particular emphasis is placed upon the study of important architectural monuments in St. Paul and Minneapolis, as well as the original works of art in the Minneapolis Art Institute, the Walker Art Center, and the St. Paul Gallery of Art. These, together with the current exhibitions and art reproductions in the University Gallery, are the working laboratories of the course. (3 cred.; all; no prereq.)

† Students may enter at any quarter.

- 2w. Introduction to Art: Ancient and Medieval Art. A general history of painting, sculpture, and architecture from prehistoric times through the Egyptian, Greek, and Roman styles to the end of the Romanesque and Gothic periods of Medieval Europe. (3 cred.; all; no prereq.)
- 3s. Introduction to Art: Renaissance and Baroque Art. The history of painting, sculpture, and architecture from the early Renaissance in Italy to the French Revolution. (3 cred.; all; no prereq.)

## FRENCH

(See Romance Languages, page 18.)

## GERMAN

- 1f,w,s. Beginning A. (5 cred. per qtr.; all; no prereq.)
- 2f,w,s. Beginning B. (5 cred. per qtr.; all; prereq. 1 or one year of high school German)
- 3f,w,s. Beginning C. (5 cred. per qtr.; all; prereq. 2 or two years of high school German)
- 4f,w,s. Intermediate German. (5 cred. per qtr.; all; prereq. 3 or three years of high school German)
- 30f-31w-32s. Medical German. (9 cred.; premed.; prereq. 3)
- 33w-34s. Medical German. (10 cred.; premed.; prereq. 3)

## HISTORY

- 90f-91w-92s. West in American History. (9 cred.; jr., sr.)
- 17s. Social and Economic History of Modern Europe—since 1500. (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.) Mr. Heaton.

## LIBRARY METHODS AND INSTRUCTION

- 1f,w,s. Use of Books and Libraries. Use of catalog, reference books, indexes, and bibliographies, for personal and class purposes. Preparation of reference lists. (2 cred.; fr., soph. only; no prereq.)
- 62w. Reference. (3 cred.; no prereq.)
- 79s. Medical Reference Work. (3 cred.)

## MATHEMATICS

**Placement tests.**—In each of Courses 1, 6, 8, and 15, a placement test will be given at some time within the first two weeks of the quarter. Any student who fails in the test in Course 1 may be required to drop the course and to review his elementary mathematics before taking college mathematics. Any student who offers less than one year of high school higher algebra as a substitute for Course 1 and who fails the placement test given in Courses 6, 8, or 15, will be required to take Course 1 before taking more advanced mathematics. A student who has had a complete year of elementary algebra, and a corresponding course in higher algebra for one-half year, should be able to pass the placement test in Courses 6, 8, or 15.

- 1f,w,s. Higher Algebra. (5 cred.; all; prereq. one year of elem. algebra; open for credit to any student offering not more than one-half year of high school higher algebra for entrance)

- 6f,w,s. Trigonometry. (5 cred.; all; prereq. plane geometry and Course 1 or high school higher algebra; open for credit to students offering high school trigonometry for entrance)
- 7f,w,s. College Algebra. (5 cred.; all; prereq. 6, or high school trigonometry if approved by the department chairman)
- 30f,w,s. Analytic Geometry. (5 cred.; all; prereq. 6 and 7 or 6 and 8)
- 50f,w,s. Calculus I. (5 cred.; jr., sr.; prereq. 30)
- 15f-16w. Elementary Mathematical Analysis. A course for premedical and other students who desire a survey of college mathematics including trigonometry, algebra, and calculus with emphasis on fundamental ideas rather than on technical preparation for more advanced courses in mathematics. (10 cred.; all; prereq. Course 1 or high school higher algebra)
- or
- 15w-16s. See 15f-16w above.

### MEDICAL TECHNOLOGY

- 51w. Introduction to Medical Technology. Lectures and discussions on certain tests performed in the hospital laboratories, including a consideration of the principles on which the methods are based, and the significance of the results. (5 cred.; open only to students already accepted in the Course in Medical Technology; three lectures and two 2-hr. lab. periods weekly)
- 52s. Junior Practical Work. Laboratory course for the purpose of instruction in the specific methods to be used and practice of technique, especially urinalysis and blood counting. (3 cred.; prereq. Med. Tech. 51; three 3-hr. lab. periods weekly)
- 101f-w-s. Methods and Clinical Orientation. Lectures and discussions on laboratory procedures, comparison of methods, fine points of technique, preparation of materials, solutions, media, etc., the use of apparatus, and laboratory organization. Case histories and patients presented to illustrate the value and importance of laboratory work to clinical practice. (6 cred.; for students taking Med. Tech. 102)
- 102f-w-s-su. Senior Practical Work, extending throughout the entire twelve months of the year (four quarters). Practical laboratory experience in a rotating service through all the laboratories of either the University of Minnesota Hospitals, the Minneapolis General Hospital, or Ancker Hospital, St. Paul. It includes training and experience in blood counting, blood chemistry, urinalysis, bacteriology, serology, basal metabolism, electrocardiography, histological technique, sputum examination, gastric analysis, and parasitology. (40 cred.)

### MUSIC

- 31f-32w-33s.† Music Appreciation. Cultivation of better understanding of music heard today. The course is designed for students with a general interest in music rather than for those majoring in music. (6 cred.; all; no prereq.)

### ORIENTATION

- 1f-2w-3s. Man in Nature and Society. An integrated survey course in which the student is introduced to the subject matter of the natural and social sciences. One of the aims of the course is to aid the student in making an intelligent selection for his college career. (9 cred.; entering fr.; no prereq.)

† Students may enter at any quarter.

- 4w. Introduction to Natural Science. (Equivalent to the first half of 1f-2w-3s) (5 cred.; entering fr.; no prereq.)
- 4s. Introduction to Natural Science. (See 4w)

### PHILOSOPHY

- 2f-1w-3s. Logic, Problems of Philosophy, Ethics. A special sequence of courses in philosophy for a limited number of freshmen who are not prelegal students. (5 cred. per qtr.; fr. only; no prereq.) Mr. Everett and others.
- 1f,w,s. Problems of Philosophy. An elementary survey of certain problems of life and knowledge, constituting an introduction to systematic philosophy. (5 cred.; open to some fr. and to soph., jr., sr.; no prereq.)
- 2f,w,s. Logic. A study of the difference between logical and fallacious reasoning; types of fallacies; rules of a good definition; syllogisms; proof; hypothesis; generalization; probability. (5 cred.; open to some fr. and to soph., jr., sr.; no prereq.)
- 3f,w,s. Ethics. Problems of life treated in terms of (1) contemporary social, political, and economic forces, and (2) the character of the individual; psychological and philosophical foundations of morality; the reconstruction of morality. (5 cred.; open to some fr. and to soph., jr., sr.; no prereq.)
- 10f. Science and Religion. (2 cred.; soph., jr., sr.; no prereq.)
- 20f,w,s. Social Philosophy. A study of conflicting social philosophies of today; liberalism vs. authoritarianism; evaluation of various social, political, and economic institutions in terms of ethical ideals; other problems of social morality; social reconstruction; social utopias. (3 cred. per qtr.; soph., jr., sr.; no prereq.)

### PHYSICAL EDUCATION FOR WOMEN

(Elective without credit)

The General Course in Physical Education offered by the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program offers an opportunity to take courses for the purpose of body building and conditioning and for the acquisition of personal and recreational skills.

**Statement of fees.**—A physical education fee of \$1.75 per quarter is charged for all starred courses. Maximum fee per student, \$3.50 per quarter.

The facilities of the Department of Physical Education for Women, including an 18-hole golf course, tennis courts, three gymnasiums, two swimming pools, squash court, large indoor sports room, and outdoor playing fields, are available for use by all women students.

### PHYSICS

- 1f-2w-3s. Introduction to Physical Science. Lectures and experimental demonstrations of the principles underlying physical phenomena. (9 cred.; all; prereq. high school algebra and plane geometry)
- 1af-2aw-3as. Introduction to Physical Science—with laboratory included. Fulfills the laboratory-science group requirement in Science, Literature, and the Arts. (12 cred.; all; prereq. high school algebra and plane geometry)

4f-5w-6s. General Physics. (Primarily for premedical students.) Mechanics, heat, sound, light, and electricity. Laboratory work is an integral part of course. (15 cred.; all; prereq. higher algebra and trigonometry, equivalent of Math. 1 and 6, or 15-16)

### PHYSIOLOGY

60s. Human Physiology. (6 cred.; primarily for medical technologists; prereq. anat. and Physiol. Chem. 101; five lectures, one 3-hr. lab. period weekly)

100f,su. Physiological Chemistry. (7 cred.; jr., sr.; prereq. zool., org. chem., and phys.)

101w,su. Physiological Chemistry. (6 cred.; jr., sr.; prereq. 100)

### POLITICAL SCIENCE

1f-2w-3s. American Government and Politics. Part 1-2. National, state, and local. Constitutions and fundamental laws; government organization; division and separation of powers; legislative, executive, and judicial procedure and problems. Part 3. Principal functions and services of government: defense, law enforcement, regulation of business, public works, and social services. (9 cred.; all; no prereq.)

1w-2s. American Government and Politics. (6 cred.; all; no prereq.)

7w,s. Comparative European Governments. The governments of Great Britain, France, Italy, Germany, and Russia. Constitutions; governmental organization; parties and elections. (3 cred.; all; prereq. for fr. and soph. Course 1: for jr. and sr. none. Course 7 may be taken simultaneously with Course 2 or 3)

15f,s. Elements of Political Science. The nature and functions of the state; sovereignty and liberty; constitutions, forms of government. (3 cred.; all; prereq. for fr. and soph. Course 1; for jr. and sr. none. Course 15 may be taken simultaneously with Course 2 or 3)

17w. Special Readings in Elements of Political Science. (2 cred.; open to students who have had or are registered in Course 15, with honor point average of 1.5 and grade of C+ in 1-2 or in portion thereof completed, and to advanced students of satisfactory standing. Consult instructor.)

25f,w. World Politics. Introduction to contemporary international relations; the policies of the great powers; nationalism; imperialism; internationalism. (3 cred.; all; prereq. for fr. and soph. Course 1 or Hist. 1-2-3; for jr. and sr. none. Course 25 may be taken simultaneously with Course 2 or 3)

### PREVENTIVE MEDICINE AND PUBLIC HEALTH

3f,w,s. Personal Health. (2 cred.; fr., soph.; no prereq.; not open to students who have taken Human Biol. 103 in the General College) Dr. O'Brien

4w,s. Health Problems of Adult Life. (2 cred.; all; prereq. 3 or Human Biol. 103 in the General College)

50f,s. Public and Personal Health. (3 cred.; open to jrs. and srs. who have not taken Courses 3, 4, 52, or Human Biol. 103 in the General College; no prereq.)

## PSYCHOLOGY

- 1f-2w. General Psychology. A general introduction to the study of human behavior with emphasis on the development of the individual. (6 cred.; 3rd qtr. fr. with C average, soph., jr., sr.; no prereq.)
- 1s,2s. General Psychology. (6 cred.; soph., jr., sr.; no prereq.)
- 3s. Psychology Applied to Daily Life. A course in the uses of psychological methods in solving such problems as come up in the treatment of ill health, in the courtroom, reformatory, and prison, in business offices and factories, in advertising, in education, in social and political life, in artistic creation and esthetic enjoyment, and in everyday life. (3 cred.; soph., jr., sr.; prereq. 1-2)
- 114w. Human Behavior. (3 cred.; sr., grad.; prereq. 1-2; 4-5 or Zool. 1-2-3, or Phil. 1)

## ROMANCE LANGUAGES

## FRENCH

- 1f-2w. Beginning French. (10 cred.; all; no prereq.)
- 3s. Intermediate French. (5 cred.; 1st qtr. of 3-4)
- 3f-4w. Intermediate French. (10 cred.; all; prereq. 1-2, or two years of high school French. Students who have had three years of high school French will omit Course 3 and take Course 4)
- 4f. Intermediate French. (5 cred.; 2nd qtr. of 3-4; prereq. 3, or three years of high school French)
- 3w-4s. Intermediate French. (See 3f-4w)

## SOCIOLOGY

- 1f,w,s. Introduction to Sociology. The study of the culture of human society. An objective analysis of culture complexes, culture patterns, cultural processes; the influence of culture on the individual's behavior; social change; and social disorganization. (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)
- 6f,w,s. Social Interaction. Influences affecting group life; forms of interaction and communication; personality and its development in the social situation; attitudes and race prejudice; forms of opposition including warfare, class tensions, coercion, and intolerance; present-day problems of co-operation, leadership, and social change in an age of science. (3 cred.; soph., jr.; prereq. 1. This course is not open to students who have had Soc. 100 or Psy. 140)
- 100f. Social Psychology. (3 cred.; jr., sr., grad., prereq. Soc. 1 and 6, or Psy. 1-2, and 9 cred. in soc. sci., ed., phil., or psy.)
- 101s. Social Organization. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.)
- 120f. Social Life and Cultural Change. (3 cred.; jr., sr., grad.; prereq. same as for 101)

## SPEECH

- 1f-2w-3s. Fundamentals of Speech. (9 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption)
- or
- 1w-2s-3f. See 1f-2w-3s above.



## X RAY

- 51w. X-Ray Physics. Principles of X-ray physics. For medical and X-ray technologists. (2 cred.; prereq. Physics 1-2-3)
- 52f,w,s. X-Ray Technique. Instruction in positioning and determination of exposures for radiography. 2 cred.; for X-ray technologists taking practical X-ray work)
- 102f,w,s,su. Practical Work. Six months of instruction and practice in radiography in hospital X-ray laboratory.

## ZOOLOGY

- 1f-2w-3s. General Zoology. (10 cred.; all; no prereq.)
- 21f,su. Histology. (5 cred.; soph., jr., sr.; prereq. 1-2-3; sections limited to 40 each. Written permission must be obtained from the Junior College office, 106 Folwell Hall)
- 22w. Comparative Anatomy. (5 cred.; soph., jr., sr.; prereq. 1-2-3) (Sections 1 and 2 limited to 40 each, section 3, to 30. Written permission must be obtained from the Junior College office, 106 Folwell Hall.)
- 51f. Introductory Animal Parasitology. (5 cred.; jr., sr.; prereq. 1-2-3; sections are limited)
- 75s. Nature Study. (3 cred.; jr., sr.; prereq. 15 cred. including 1-2-3)
- 82w. Evolution. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or Bot. 1, 7, 21)
- 83s. Introduction to Genetics and Eugenics. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 10 cred. in bot.)

*The Bulletin of the*  
UNIVERSITY of MINNESOTA

School of Nursing Announcement  
for the Year 1941-1942

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Volume XLIV, Number 42

July 5, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

# UNIVERSITY CALENDAR

1941-42

## *Fall Quarter*

1941			
September	15	Monday	Extension registration first semester begins
September	18	Thursday	Payment of fees closes for students in residence spring quarter
September	22	Monday	Entrance tests
September	22-23		Registration for Freshman Week for all new stu- dents entering the freshman class
September	22-26		Examinations for removal of conditions Physical examinations Registration period, <sup>1</sup> College of Science, Litera- ture, and the Arts, and General College
September	24-27		Freshman Week
September	25-26		Registration days <sup>1</sup> for all colleges not included above. Payment of fees closes for all students in Science, Literature, and the Arts, General Col- lege, Education, Public Health Nursing, Medical School, Medical Technology, and for new stu- dents in other colleges except Graduate School
September	29	Monday	Fall quarter classes begin 8:30 a.m. <sup>2</sup> First semester extension classes begin <sup>3</sup>
October	4	Saturday	Last day for extension registration without penalty
October	11	Saturday	Last day for Graduate School registration and payment of fees
October	16	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Homecoming Day
November	8	Saturday	Dads Day
November	11	Tuesday	Armistice Day; a holiday (except for extension)
November	20	Thursday	Thanksgiving Day; a holiday
December	12-13 and 15-18		Final examination period
December	18	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends 6:00 p.m. <sup>4</sup>

## *Winter Quarter*

December	26	Friday	Payment of fees closes for all students in residence fall quarter in undergraduate colleges
1942			
January	2	Friday	Entrance tests
January	2-3		Registration <sup>1</sup> for new students in all colleges. Pay- ment of fees closes at 12:00 noon, January 3 for students in all colleges except the Graduate School
January	5	Monday	Winter quarter classes begin 8:30 a.m. <sup>2</sup>
January	17	Saturday	Last day for Graduate School registration and payment of fees
January	26	Monday	Extension registration second semester begins
*February	7	Saturday	First semester extension classes close
February	9	Monday	Second semester extension classes begin <sup>3</sup>

See footnotes on page 3.

February	12	Thursday	Lincoln's Birthday; a holiday (except for extension)
February	14	Saturday	Last day for extension registration without penalty
February	19	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	23	Monday	Washington's Birthday; a holiday
March 13-14 and 16-19			Final examination period
March	19	Thursday	Commencement Convocation Payment of fees closes for all students in residence winter quarter in undergraduate colleges Winter quarter ends 6:00 p.m.

*Spring Quarter*

March	27	Friday	Entrance tests
March	27-28		Registration <sup>1</sup> for new students in all colleges except the Institute of Technology. Payment of fees closes at 12:00 noon, March 28 for new students in all colleges except Graduate School
March	30	Monday	Spring quarter classes begin 8:30 a.m. <sup>2</sup>
April	3	Friday	Good Friday; a holiday (except for extension)
April	11	Saturday	Last day for Graduate School registration and payment of fees
May	9	Saturday	Mothers Day
May	14	Thursday	Cap and Gown Day Convocation Senate meeting, 4:30 p.m.
May	30	Saturday	Memorial Day; a holiday (except for extension)
June	5	Friday	Second semester extension classes close
June 5-6 and 8-12			Final examination period
June	7	Sunday	Baccalaureate service
June	12	Friday	Spring quarter ends 6:00 p.m.
June	13	Saturday	Seventieth annual commencement

*Summer Session*

June	15-16		Registration, first term. Payment of fees closes at 4:00 p.m. June 16 for all colleges
June	17	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
July	23	Thursday	Commencement Convocation
July	24	Friday	First term closes
July	27	Monday	Second term registration and payment of fees close at 4:00 p.m. July 27 for all colleges Second term classes begin 8:00 a.m.
August	28	Friday	Second term closes

<sup>1</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 58, Bulletin of General Information. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>2</sup> First hour classes begin at 8:15 a.m. at University Farm.

<sup>3</sup> This date does not refer to correspondence study courses, which may be started at any time during the year.

<sup>4</sup> Extension classes continue to Saturday, December 26, and will resume Monday, January 5, 1942.

## FACULTY

- Walter C. Coffey, M.S., LL.D., Acting President  
Harold S. Diehl, M.A., M.D., D.Sc., Dean of Medical Sciences  
Wesley E. Peik, Ph.D., Dean of the College of Education  
Katharine J. Densford, R.N., M.A., Director of the School of Nursing and  
Professor of Nursing  
Mellie F. Palmer, R.N., B.S., C.P.H., Assistant Professor of Preventive  
Medicine and Acting Director of the Course in Public Health Nursing  
William S. Carlson, Ph.D., Director of Admissions and Records  
True E. Pettengill, M.S., Recorder  
Lucile Petry, R.N., M.A., Assistant Director of the School of Nursing and  
Associate Professor of Nursing  
Ruth Harrington, R.N., M.A., Assistant Professor of Nursing Education  
Frances M. Lucier, R.N., B.S., Assistant to the Director of the School of  
Nursing  
Ida M. MacDonald, R.N., B.A., Assistant Professor of Nursing  
Thelma Dodds, R.N., B.S., Superintendent of Nurses and Assistant Pro-  
fessor of Nursing (b)\*  
Cecilia Hauge, R.N., M.A., Superintendent of Nurses (a) and Assistant  
Professor of Nursing  
Dorothy S. Kurtzman, R.N., Superintendent of Nursing Projects (a) and  
Assistant Professor of Nursing  
Julia M. Miller, R.N., M.A., Superintendent of Nurses (c) and Assistant  
Professor of Nursing  
Laura A. Draper, B.A., B.S., R.N., Clinical Assistant Professor of Pre-  
ventive Medicine and Public Health (e)  
Gertrude I. Thomas, Assistant Professor of Dietetics (a)  
Eleanor I. Baird, R.N., B.S., Instructor in Nursing (c)  
Margaret E. Benson, R.N., B.S., Instructor in Nursing (c)  
Gladys Bratholt, R.N., B.S., Instructor in Nursing (c)  
Hannah Burggren, R.N., B.S., Instructor in Nursing (c)  
Bernice Dalen, R.N., B.S., Instructor in Nursing (c)  
Marguerite Donker, R.N., B.S., Instructor in Nursing (a)  
Emma Einerson, R.N., B.S., Instructor in Nursing (d)  
Esther Garrison, R.N., B.S., Instructor in Nursing (c)  
Marion Gere, R.N., Instructor in Nursing (b)  
Eva Gregerson, Instructor in Dietetics (b)  
Lucile Halverson, R.N., B.S., Instructor in Nursing (a) and Nursing Super-  
visor  
Eileen Hanson, R.N., B.S., Instructor in Dietetics (c)  
Christy T. Hawkins, R.N., B.S., Instructor in Nursing (b)  
Margaret F. Heyse, R.N., M.S., Instructor in Nursing (a)

\* The letters in parentheses indicate the particular agency in which the instructor serves: (a) University of Minnesota Hospitals; (b) Charles T. Miller Hospital; (c) Minneapolis General Hospital; (d) Glen Lake Sanatorium; (e) Community Health Service; (f) Family Nursing Service.

Frances W. Hoffert, R.N., B.S., Instructor in Nursing (c)  
 Ilaine Larson, R.N., B.S., Instructor in Nursing (a)  
 Beatrice Lofgren, R.N., B.S., Instructor in Nursing (c)  
 Gertrude Lyons, R.N., Clinical Instructor in Preventive Medicine and Public Health (f)  
 Katherine M. McMillan, R.N., B.S., Instructor in Nursing (c)  
 Pearl Shalit, R.N., M.S.S., Clinical Instructor in Preventive Medicine and Public Health (f)  
 Una M. Stalland, R.N., B.S., Instructor in Nursing (c)  
 Jean Taylor, R.N., B.S., Clinical Instructor in Preventive Medicine and Public Health (e)  
 Florence Brennan, R.N., B.S., Assistant (c)  
 Eva Burggren, R.N., Assistant (b)  
 Nell Dahl, B.S., Assistant (a)  
 Emma Fischer, R.N., Assistant (c)  
 Helen McHale, R.N., Assistant (b)  
 Ellen Rasmussen, R.N., Assistant (a)  
 Ella Smitka, R.N., Assistant (a)

## COMMITTEES

### ADMINISTRATIVE COMMITTEE

Walter C. Coffey, M.S., LL.D., Acting President  
 Harold S. Diehl, M.A., M.D., D.Sc., Dean of Medical Sciences  
 Wesley E. Peik, Ph.D., Dean of the College of Education  
 Katharine J. Densford, R.N., M.A., Director of the School of Nursing and Professor of Nursing  
 Irvine McQuarrie, M.D., C.P.H., Ph.D., Professor of Pediatrics and Head of the Department of Pediatrics  
 Mellie F. Palmer, R.N., B.S., C.P.H., Assistant Professor of Preventive Medicine and Public Health and Acting Director of Course in Public Health Nursing  
 Cecilia Hauge, R.N., M.A., Superintendent of Nurses, University of Minnesota Hospitals  
 Dorothy S. Kurtzman, R.N., Superintendent of Nursing Projects  
 Julia M. Miller, R.N., M.A., Superintendent of Nurses, Minneapolis General Hospital

### STUDENTS' WORK COMMITTEE

Katharine J. Densford, R.N., M.A., Director of the School of Nursing  
 Thelma Dodds, R.N., B.S., Superintendent of Nurses, Charles T. Miller Hospital  
 Cecilia Hauge, R.N., M.A., Superintendent of Nurses, University of Minnesota Hospitals  
 Julia M. Miller, R.N., M.A., Superintendent of Nurses, Minneapolis General Hospital

*SCHOOL OF NURSING*

Ruth E. Boynton, M.S., M.D., Director of Students' Health Service and  
Professor of Preventive Medicine and Public Health  
Anne D. Blitz, M.A., LL.D., Dean of Women  
Edmund G. Williamson, Ph.D., Dean of Students

## ADVISORY COMMITTEE

Ray M. Amberg, Ph.C., Superintendent of University of Minnesota Hospitals  
Donald W. Pollard, M.D., Superintendent of the Minneapolis General  
Hospital  
Peter D. Ward, M.D., Superintendent of the Charles T. Miller Hospital  
Administrative Committee  
Students' Work Committee

## GENERAL INFORMATION

### HISTORICAL STATEMENT

The University of Minnesota School of Nursing, authorized by the Board of Regents October 1, 1908, was established March 1, 1909, as a result of the efforts of Dr. Richard Olding Beard. It was the first university school of nursing in the world and, as such, led the way for other university schools which followed. The first university school carried a three-year undergraduate curriculum leading to the degree of graduate in nursing until June 9, 1919, at which time it established a five-year program leading to the degree of bachelor of science and graduate in nursing. Since that time it has carried both a three- and five-year curriculum, and, up to July 1, 1941, has graduated 1,650 with a diploma in nursing, of whom 416 have also received a bachelor of science degree. A distinctive feature of the five-year curriculum has been the requirement of seventy-five university credits before the student matriculates in the School of Nursing proper. As a result, the entire clinical program is made more meaningful than would otherwise be possible.

Another first step was taken December 14, 1920, when the plan of a central school was approved by the University. From the beginning, the University had felt that it should offer the courses it was developing for its own nursing students to other hospitals. The hospitals wishing to take part in such a venture were the Minneapolis General Hospital, the Charles T. Miller Hospital, and the Northern Pacific Beneficial Association Hospital of St. Paul. It was felt that the inclusion of these hospitals would introduce desirable practice fields for the University School of Nursing and would make possible a uniform standard of preparation for the nurses in these hospitals of a higher level than they could achieve individually. The arrangements were completed, therefore, in 1921. Tho no formal contract was made, a memorandum of agreement was drawn and agreed upon by the University and the allied hospitals. On March 30, 1921, the first students in this central school of nursing were admitted to the University.

On February 19, 1925, the curriculum of clinical experience was further enriched by means of an agreement with the Hennepin County Sanatorium Commission whereby university nurse students were to receive six weeks' clinical experience (a shortened period later) at the Glen Lake Sanatorium in the care and treatment of tuberculous patients.

On January 1, 1933, the Northern Pacific Beneficial Association Hospital arranged to staff its entire nursing service with graduate nurses and nonprofessional workers, thereby aiding in the problem of unemployment among graduate nurses.

Beginning March, 1934, all students received six weeks' field experience in public health nursing (most had received it since 1932) in what is now known as the Community Health Service in Minneapolis and the Family Nursing Service in St. Paul. Due to the overcrowding of the public health



field, these agencies, beginning fall, 1939, were unable longer to give field experience to all three-year students. In lieu thereof these students are now receiving four weeks' experience in the Nursery School plus two additional weeks in the out-patient department.

Since June, 1934, the Charles T. Miller Hospital has accepted no freshman students for assignment in that hospital. It has instead replaced freshman students with graduate nurses and nonprofessional workers, and has given experience in nursing the private patients to all students of the school.

Beginning March, 1938, trial was made of having three-year students who come directly from high school, together with all three-year students who have less than seventy-five college credits, *enter in the fall quarter only*. Five-year students, together with all three-year students who have seventy-five or more college credits (with one honor point per credit) are admitted to the School of Nursing in both fall and spring quarters.

From its inception, the school has maintained high standards for the professional and personal preparation of its students and for the nursing care of patients in its charge. Graduates of the school have made fine contributions not only to their own school, but also to the profession of nursing both in this country and abroad.

The earlier years of the school's existence were devoted to the establishment of this new type of university education while the later ones have been used for the perfecting of the plan made necessary by the merging of the university school with other schools of nursing. Future years should see continued utilization of these early foundations with increasing emphasis on the preventive phases of the nurse's preparation that she may continue to meet adequately the ever increasing and ever broadening demands made upon her.

#### PURPOSES OF THE SCHOOL

The purposes of the University of Minnesota School of Nursing are:

To prepare young women intelligently and skillfully to recognize and to meet community needs for nursing, both curative and preventive.

To initiate a pattern for continued personal and professional growth based on a background of general culture and of social and biological sciences.

To discover and stimulate qualities of leadership.

To prepare nurses for special fields of nursing education and public health nursing.

#### ORGANIZATION

The School of Nursing functions in the field of medical sciences, the director of the school being responsible to the dean of medical sciences and for certain phases of the school's work to the dean of the College of Education. The administration of the school is conducted largely through the faculty and committees, as follows:

1. **The faculty.**—A faculty of a school in the University of Minnesota, according to the Constitution and By-Laws of the University Senate, controls the internal affairs of the school, including entrance requirements,

curricula, instruction, examinations, grading, degrees, discipline, and the selection and conditions of use of departmental library.

2. **The Administrative Committee** (see page 5), decides all matters of educational policy and general conduct of the School of Nursing.

3. **The Students' Work Committee** (see page 5), assists in determining policies regarding individual students, their acceptance into the school, continuance, discipline, etc., and makes recommendations concerning the general conduct of the school.

4. **The Advisory Committee** (see page 6), composed of the Administrative Committee, the Students' Work Committee, and the superintendent or executive officer of each associated hospital, decides matters involving the expenditure of hospital funds.

#### UNIVERSITY PRIVILEGES

Nurse students enjoy the same university privileges as do other students in so far as their nursing practice will permit. They have representation in such student groups as the All-University Student Council and, in the case of five-year students, are eligible for membership in honorary and social societies. There are two nursing societies, one open to five-year students and the other open to both five- and three-year students.

Nurse students have free access to the University Library which is located in the main quadrangle of the University. In this library are about 1,165,000 volumes of books and some 19,514 current serials. The nursing library proper is located on the second floor of the building as a part of the biological-medical library. Library hours are from 8:00 a.m. to 10:00 p.m. on week days.

Coffman Memorial Union, the center of student activities on the campus, is open to nurse students as to others. Among the many facilities provided by this modern new building are ballrooms adequate for student social affairs, committee and general meeting rooms for student organizations, the student post office, lounges, restaurant, and cafeteria.

Nurse students are entitled to make use of university tennis courts, golf course, gymnasium, and swimming pool and may buy tickets for all athletic events at student rates.

The Y.W.C.A. of the University is open to all women students as are the student religious organizations sponsored by churches of different denominations.

Perhaps the greatest privilege accorded the students is that of attending lectures and concerts in the University either free or at markedly reduced student rates. Among these are the symphony concerts given by the Minneapolis Symphony Orchestra in the Cyrus Northrop Auditorium; the University Artists Course; and the Thursday morning convocation lectures as well as special lectures in the various departments. Student dramatic organizations present several worth-while plays on the campus each year.

## EMPLOYMENT

Students cannot carry on outside employment while in the School of Nursing proper, but may do so while carrying the pre-nursing curriculum in the College of Science, Literature, and the Arts. For detailed information regarding student employment refer to the General Information Bulletin, page 46, and the bulletin on "University Aids for Student Expenses," or write to the University Employment Bureau.

## SCHOLARSHIPS, LOANS, PRIZES

Students in either the five- or three-year course are eligible, after two quarters of satisfactory work in the University, to apply for loans from the university loan funds. Graduate nurses working for degrees are also eligible for the loan after two quarters of satisfactory work. For information regarding the loans write the recorder for the bulletin, "University Aids for Student Expenses."

The following three special awards are made to students in the graduating classes of the School of Nursing:

## LOUISE M. POWELL PRIZE

A gift of \$50 annually from the Alumnae Association of the School of Nursing for the establishment of the Louise M. Powell Prize of \$25 to be awarded to that member of the March and June graduating classes in the School of Nursing of the University of Minnesota who has attained the highest degree of efficiency in practical work.

## MARION L. VANNIER SCHOLARSHIP

A gift of \$100 annually from the Nurses' Self-Government Association of the University of Minnesota for the establishment of the Marion L. Vannier Scholarship. The recipient of this scholarship must be a graduate of the School of Nursing of the University of Minnesota. The scholarship is to be used for the purpose of higher education only, within two years after recipient's graduation.

## ALPHA TAU DELTA SCHOLARSHIP

The Alpha Tau Delta, national scholarship society of the five-year nursing course, grants an annual scholarship of \$100 in honor of Esther M. Thompson, class of 1925, to a senior member of the Alpha Tau Delta ranking high in theoretical and practical work. This scholarship is awarded for purposes of study within two years after graduation.

## RICHARD OLDING BEARD LOAN FUND

The alumnae of the school have made available through the Endowment Fund a sum of \$150 to be used as a loan to graduates of the school for further academic study. The recipient must have had one year of successful nursing experience following graduation.

## MINNESOTA LEAGUE OF NURSING EDUCATION LOAN FUND

The Minnesota League of Nursing Education has made available the sum of \$500 to be used as a loan to qualified graduate nurses for the purpose of further academic study.

## MAINTENANCE SCHOLARSHIPS

A limited number of maintenance scholarships for the first quarter in the School of Nursing (equivalent to \$115) are available to qualified college graduates.

## OTHER SCHOLARSHIPS AND LOAN FUNDS

Many of the district and state nursing associations have established scholarships and loan funds for graduate nurses wishing to take up university work. In Minnesota information concerning such a fund, the Sarah T. Colvin Loan Fund, may be had from the Minnesota Nurses' Association, 2642 University Avenue, St. Paul, Minnesota. Certain graduate nurses are also eligible for scholarships of the national nursing organizations. Among these are the Isabel Hampton Robb Memorial Scholarship Fund, under which scholarships are available annually, on a competitive basis, in the spring, and the McIsaac Loan Fund, available any time. Information concerning these may be had from Mrs. Mary C. Eden, The Fairfax, 43rd and Locust Streets, Philadelphia, Pennsylvania.

## NURSES' RESIDENCES

Nurse students are housed in the various hospital residences during their period of clinical experience (nursing practice). The Charles T. Miller Hospital has an attractive residence housing 135 persons, all in single rooms. The University of Minnesota Hospitals houses its students in the Louise M. Powell Hall built near the University of Minnesota Hospitals on ground overlooking the Mississippi River. This building houses approximately 300 persons. Students at the Minneapolis General Hospital have a residence adjoining, but apart from, the hospital. The students take their meals in the nurses' dining rooms, which are under the direction of qualified dietitians. Each residence has a qualified director in charge.

Students in the five-year curriculum provide their own maintenance during the first six quarters. They may secure rooms in Comstock or Sanford Hall (the women's dormitories) or in approved rooming houses near the University by request to the Housing Bureau, 119 Administration Building, University of Minnesota. During the time that students carry clinical experience in the school they have maintenance provided for them in the various hospital nursing residences. In the last three quarters of combined academic and nursing work they provide their own maintenance as in the first six quarters. Students in the three-year curriculum provide their own maintenance during the first quarter on the same basis as the five-year students. They have maintenance provided in the various hospital residences after the first quarter.

Assignment of students in the five- and three-year curricula for residence in the various hospitals is made by the Students' Work Committee.

Approximately one half of the students are assigned by the committee to the nurses' residence at the Minneapolis General Hospital, the other half being assigned to Powell Hall at the University of Minnesota Hospitals until about the middle of their experience when these two groups are interchanged.

Students in affiliating and postgraduate curricula are provided maintenance in the nurses' residences during their period of enrolment in the school.

The rules governing the residences are made in accordance with university policies and carried out with the joint approval of the faculty of the School of Nursing and the Council of the Nurses' Self-Government Association.

### STUDENT ACTIVITIES

The leading student organization of the School of Nursing is the Nurses' Self-Government Association. This organization assists the faculty in practically all such student affairs as pertain to off-duty hours. Nurse students are admitted to membership at the end of the first six months in the school by passing an examination, conducted by the association, on their constitution, a copy of which is furnished every student when she enters. Students continue in membership so long as they remain in good standing in the school and pay the nominal dues of the organization. They elect a president and governing council of officers so chosen that there are representatives of the council in each of the hospitals. This organization usually sends a representative to the meetings of the American Nurses' Association, the National League of Nursing Education, and the Minnesota Nurses' Association.

One of the activities of the student government is to appoint upper classmen to act as "big sisters" for all entering students to assist them in adjusting to their new environment.

The hospitals have frequent informal teas and parties for the students and the students themselves are encouraged to plan any form of recreation which interests them and which can be wisely undertaken in addition to their nursing duties.

The school is nonsectarian tho students are urged to form church affiliations in accordance with their choice and custom. Churches of various denominations are within walking distance of the residences so that it is possible for students to attend either morning or evening service.

Affiliating and postgraduate students are urged to participate in student activities. Both of these groups make "big sister" appointments to assist incoming students. The postgraduate students have a form of organization for their group.

### ORIENTATION PROGRAM

A definitely planned orientation program for freshman students has been developed and is carried on under the direction of a member of the faculty.

## SCHEDULE OF HOURS

During the first quarter in the School of Nursing proper, regular undergraduate students carry approximately twenty-four hours of class but have no practical experience in the nursing care of patients.\* With the beginning of the second quarter they receive from approximately six to approximately twenty-seven hours of clinical experience weekly and carry approximately an average of nineteen hours of class. From the beginning of the third quarter and throughout the remainder of the two and one-half years (in the case of three-year students, three years) the hours of clinical experience are in almost all instances forty-two per week. The hours of class during this same period are approximately six per week with the exception of the Summer Session when the class program is either reduced or omitted. Except in the case of emergencies, the time of the students on full-time duty does not exceed a seven-hour day or an eight-hour night. Assignment of night duty for regular students is for approximately two months (of not more than three weeks consecutively) during the entire period in the school.

Affiliating students carry approximately forty-two hours per week of clinical experience (as do the undergraduate students) and from three to six hours of correlating class work.

Hours of duty permit the postgraduate students to carry a fairly heavy class schedule during nine months but to be entirely free of classes during three months in which time they have experience in administration. In the course in Operating Technique, Teaching, and Administration the hours are thirty per week during approximately nine months and forty-eight per week during approximately three months. In all other courses the hours are twenty-one per week during approximately three months, thirty-six† during approximately six months, and forty-eight during approximately three months.

## VACATION

Five-year students have vacations as do other university students during their first five quarters and during the last three quarters. During their hospital residence they receive approximately nine weeks of vacation at their own living expense. Students entering at the beginning of the fall quarter will have approximately one to two weeks at Christmas time, two weeks during the succeeding summer, four weeks the following summer, and two weeks during the last summer. Students entering at the beginning of the spring quarter will have approximately two weeks the first summer, four weeks during the second summer, and two to four weeks during the third year.

Three-year students have practically the same vacation as do the five-year students in their period of hospital residence.

Affiliating students enrolled for less than one year and postgraduate students receive no vacation.

Affiliating students enrolled for one year receive two weeks' vacation.

\* Five-year students usually have fewer class hours because of having carried certain required courses during the prenursing period.

† The period of thirty-six hour duty begins immediately after the close of the fall quarter class schedule.

## SUGGESTED HIGH SCHOOL SUBJECTS

Students in high school who are considering the study of nursing are required so to arrange their high school subjects that they meet the entrance requirements of the College of Science, Literature, and the Arts of the University of Minnesota whether they elect the five- or three-year curriculum. By meeting these requirements, students who take the three-year curriculum may later apply their credits in nursing toward a bachelor of science degree, a privilege not open to students who meet only the minimum university requirements.

In the matter of elective subjects students should choose subjects in which they are particularly interested, with the guidance of high school advisers. It is well to avoid "vocational units" so far as possible. Students are advised to take chemistry in high school. *Mathematics is desirable as it is essential that the students have a good working knowledge of arithmetic.* English, history, physics, and social sciences are all recommended, and a foreign language, provided two units can be completed.

## PREPARATION AND OPPORTUNITIES

The profession of nursing entails much the same type of requirements and preparation for successful practice as do other professions. Positions for graduate nurses are now open in every field, and for positions requiring advanced preparation it is extremely difficult to find well-qualified personnel. To the good student who is willing to prepare herself rightly, many satisfying opportunities are open in the various fields. Some of these opportunities are for the positions of general duty, head nurse, supervisor, instructor, private duty, industrial nurse, visiting nurse, infant welfare nurse, and school nurse. Graduates of the School of Nursing now hold important positions in all these fields both in this country and in foreign countries.

## GENERAL REGULATIONS

NOTE.—Due to social and economic conditions, the University of Minnesota reserves the right to alter any program or policy outlined in this bulletin.

### ADMISSION

Each student who wishes to enter the University, either as a freshman or with credits from another institution, must fill out the information called for on pages 1 and 2 of the official application blank. This blank can be obtained from the recorder or from any Minnesota state high school.

The applicant for admission from high school should then give the application blank to the high school principal or superintendent with the request that it be completed and forwarded to the recorder of the University.

The applicant for admission from another college may send the information on pages 1 and 2 direct to the recorder, and in addition, she should request the college last attended to forward to the University of Minnesota an "official transcript of record" and an "honorable dismissal."

The applicant for admission by examination should submit the information on pages 1 and 2 direct to the recorder, who will issue an authorization for the entrance examination.

*All applicants* should submit with application a recent snapshot or passport-size photograph.

### ADMISSION FROM HIGH SCHOOL

Admission to the freshman class is either by certificate or by examination.

Most students entering the freshman classes of the University are high school graduates. In order to enter without entrance examinations, the applicant must be a graduate of an accredited high school of Minnesota, or of a high school on the approved list of some other recognized state or regional accrediting institution.

For admission to any college of the University which accepts students without preliminary college training, an applicant must present a record of at least twelve units completed in Grades X, XI, and XII (senior high school). For definition of units and groups see the Bulletin of General Information, pages 34 to 39.

At least nine of these twelve units must be subjects listed in Admission Groups A, B, C, D, and E. The other three units may be in Group F.

The nine units from Admission Groups A, B, C, D, and E must include a major and two minors, or preferably, two majors and one minor from at least three different admission groups.

Either one major or one minor must be in Admission Group A (English).

From either Admission Group B (foreign languages) or Admission Group D (mathematics) *but not from both*, one unit completed in Grade IX may be used to make a major or minor. If this is done, however, the



unit completed in Grade IX may not be counted as a part of the minimum of twelve units required from Grades X, XI, and XII.

In addition to the above requirements, the individual colleges have specified certain group and subject-matter requirements. Those for the School of Nursing are as follows:

Major in Group A

Major or minor in Group D

Major or minor in Groups B, C, D, E

Those for the College of Education special curricula (required for graduate nurses working for the B.S. degree in nursing education or public health nursing) are as follows:

Major in Group A

Major or minor in each of two of the Groups B, C, D, E

#### ADMISSION BY EXAMINATION

Applicants who are not graduates of accredited high schools may meet the admission requirements in one of the following ways:

1. By presenting Minnesota State High School Board certificates in the necessary subjects;
2. By presenting similar certificates from examining boards of other states;
3. By presenting certificates representing examinations given by the College Entrance Board; or
4. By passing successfully the University of Minnesota entrance tests as described below.

#### UNIVERSITY OF MINNESOTA ENTRANCE TESTS

These tests may be taken by any high school graduate whose high school credits do not meet the special requirements of the college she wishes to enter.

They may be taken also by any individual who is not a high school graduate provided she is nineteen years of age or older.

Any applicant who passes these tests will be admitted provisionally subject to one year of satisfactory work at the University.

Most graduates of Minnesota high schools will have taken these tests in connection with the state testing program conducted in the high schools throughout the state each year.

Special tests will be required as supplementary evidence of ability to carry the work in the School of Nursing in the case of students with low entrance ratings.

In order to take the tests at the University, the official application blank should be filed with the recorder according to the instructions on page 15.

Detailed information as to where and when to report for the tests and an authorization for the tests will then be forwarded.

In special cases, arrangements will be made to have the tests given near the applicant's home in order to save the expense of travel to the University. In such cases a \$5 fee is charged. There is no fee if the tests are taken at the University.

These tests are intended to measure aptitudes for college work rather than specific information in high school fields. No special preparation for the tests is practicable.

Each applicant for admission by means of the university entrance tests will be required to take the college aptitude test and an English placement test.

#### REGULATIONS GOVERNING ADMISSION

Applications for admission should be made in writing to the recorder, University of Minnesota. Information and application blanks can be had upon request to the recorder. *Application blanks and educational credentials must be on file in the recorder's office before the applicant can be given consideration.*

Final acceptance is made at a meeting of the Enrolment Committee of the School of Nursing at which time the general fitness of the applicant for the field of nursing is considered. The committee reserves the right to reject any candidate who seems to the faculty unsuited for the nursing profession. Meetings of the committee are held at the beginning of the fall and spring quarters, at which time students are admitted to the school, *students with 75 or more college credits with C average being admitted in the spring and fall, students with less than 75 college credits being admitted only in the fall. An average of C is required of all students in whatever courses are completed. In addition an average of C must be maintained in the four basic sciences of anatomy, bacteriology, physiological chemistry, and physiology.* Applicants may meet the committee at its meeting six months prior to the date they intend to enter, if they wish, but ordinarily they meet the committee on the date they wish to enter the school. Every precaution is taken to warn applicants in advance if their records seem to indicate that they are not suited to enter the field of nursing. A battery of tests is given during registration week and scores are used for assistance in guidance throughout the course. *A test covering mathematical processes involved in nursing is given during registration week and students whose background is insufficient are required to furnish evidence of study of this subject and to pass a second examination at the end of the quarter.* A sample of this test may be had upon request. Review of arithmetic is advised for all applicants.

#### FIVE-YEAR CURRICULUM

Applicants for admission to the five-year curriculum must meet the entrance requirements of the College of Science, Literature, and the Arts, as given on page 35 of the Bulletin of General Information. They will register in the College of Science, Literature, and the Arts during the first five quarters of the curriculum. They may enter the University before the age of eighteen but must be eighteen when starting clinical practice.

Acceptance into the School of Nursing is not made until the 75 credits of the prenursing subjects have been completed (see outline of the five-year curriculum, page 27). Students who have taken work in junior colleges or other colleges or universities, may apply the credits toward the five-year

curriculum. Official transcripts of such credits should be submitted to the university recorder for evaluation. Students may begin the prenursing portion of the five-year curriculum at the beginning of any quarter, altho the fall quarter is the most satisfactory admission date. The spring quarter is the most satisfactory time to begin the sixth quarter of the nursing curriculum and applicants having completed 75 or more college credits should arrange their transfer so that their sixth quarter is a spring quarter. Tho less desirable, the fall quarter also may be the sixth quarter.

#### CURRICULUM FOR COLLEGE GRADUATES

The state law of Minnesota (like that of many other states) requires the nursing curriculum to be three years in length. Applicants with a Bachelor's degree are admitted directly to the nursing portion of the five-year curriculum, which is two and one-half years in length. These students then select special electives during an additional six months. The student may use this time in working toward a degree of bachelor of science in the field of nursing education or of public health nursing, or she may begin work toward a more advanced degree. She may, also, if she desires, spend this period in some special field such as that of psychiatric nursing or out-patient nursing in this school or in other schools.

#### THREE-YEAR CURRICULUM

Applicants for admission to the three-year curriculum must meet entrance requirements as stated on page 15. Students whose high school records were not good are not advised to enter the field of nursing. In considering the applicants the Enrolment Committee gives preference to those students who ranked in the upper fourth of their high school class. For requirements of physical fitness see Health Regulations, page 23.

To be eligible for registration in the state of Minnesota the nursing school graduate must be twenty-one years of age. Therefore, applicants under eighteen years of age are especially urged to elect the five-year curriculum. They must be eighteen upon entrance to the school.

#### DEGREE CURRICULUM FOR GRADUATE NURSES

Applicants for admission to this course must meet the entrance requirements of the College of Education special curricula (see page 16) and submit evidence of graduation from an accredited school of nursing.

#### POSTGRADUATE CURRICULA

Applicants for admission to all postgraduate courses must (1) be registered nurses; (2) have had one year of successful experience, preferably in institutional work; (3) have completed college courses in Sociology 1 and in Psychology 1 and 2 with a grade of C, or one year of satisfactory college work; and (4) meet the minimum entrance requirements for admission to the University of Minnesota, including such entrance tests as the English Placement Test (described below), a battery of nursing tests, and a reading test. They should write to the recorder, University of Minnesota, for

application blanks. These should be filled out and placed on file in the recorder's office at least one month in advance of the quarter in which the applicant wishes to enter.

Postgraduate students are admitted each quarter in the operating room and fall quarter only in all other courses. Only a limited number of applicants can be accepted in any one quarter.

In an attempt to admit only those students who in their undergraduate nursing curriculum already have mastered satisfactorily a basic course in the chosen field, examinations will be given applicants in respective clinical subjects except in the case of the Operating Room course. If the examination is not satisfactorily passed, the applicant will be admitted to the postgraduate course only after offering evidence of successful repetition of the undergraduate basic course in this school or in another school approved by our faculty. For this reason prospective postgraduate students are urged to apply well in advance of the admission date in order that their admission not be postponed until the following year because of necessity for completing the undergraduate basic course. At the time the examination is taken tests of nursing aptitude, interest, and ability will also be administered. A fee of \$1 is charged for these tests.

Proper blanks on which the nursing school credits and high school credits should be sent in can also be had by request to the recorder, University of Minnesota.

#### COURSES FOR AFFILIATING STUDENTS

By special arrangements with other schools of nursing approved by the State Board of Nurse Examiners, students from these schools are admitted at stipulated times for additional experience and instruction. Such students must meet the requirements of their own school, and must meet also the requirement of high school graduation or its equivalent.

#### ADMISSION WITH ADVANCED STANDING

Students with partial completion of a full college course are advised to bring their qualifications to those of the five-year curriculum. Since the state law requires that the nursing curriculum be three years in length, it is not possible to shorten the period of three years for students entering with previous college credit. For required courses, however, in which they have already received credit they may, after admission to the school, make substitution of desired electives.

#### ADMISSION FOR TRANSFERRING STUDENTS

It is not the policy of the School of Nursing to accept students wishing to transfer from other schools of nursing. In almost every case the first two quarters must be repeated and a great deal of time is lost for the student in transfer.

## ESTIMATE OF EXPENSES OF NURSING SCHOOL CURRICULUM

**All university fees are subject to modification without notice**

*Five-Year Curriculum*

Estimate of total university required expense for entire five-year curriculum would vary from about \$600 for residents of the Twin Cities who live at home to about \$1,590 for *residents* who pay very liberally for board and room. *Nonresidents* should add about \$150 to these sums. Estimates below do not include clothing, incidentals, traveling, and vacation expenses.

**Tuition fee.**—During the first five quarters the student is registered in the College of Science, Literature, and the Arts, for which the tuition fee is twenty-five dollars (\$25)‡ each quarter. Registration for the sixth quarter is in the School of Nursing with tuition fee of twenty-seven dollars (\$27).‡ During the fifth year the student is registered in the College of Education with tuition fee of twenty-five dollars (\$25)‡ each of two quarters. The other quarter may involve Summer Session fees of about \$32. While the student is in hospital residence, there is no tuition fee.

Total tuition fee.....\$227.00

**Incidental fee.**—An incidental fee of eight dollars and fifty cents (\$8.50) a quarter is charged each student, for which the student receives the privileges of the Coffman Memorial Union, the Health Service, the *Minnesota Daily*, including the Official Daily Bulletin, the university post-office service, and the *University Address Book*. These privileges are received by students of this curriculum for six quarters preceding the period of hospital residence and three quarters during the fifth year.

Total incidental fee.....\$76.50

**Matriculation deposit.**—At the students' first registration at the University a matriculation deposit of ten dollars (\$10) is required to cover the following charges: locker rental, locker key deposit, laboratory breakages, library fines, or damages to university property.

**Laboratory deposit.**—A laboratory deposit of five dollars (\$5) is also required of students registered for courses in chemistry to cover cost of materials.†

**Public health nursing field practice fee.**—Three dollars (\$3).

**Condition examination fee.**—One dollar (\$1).

**Cost of books.**—The expense varies with the courses taken. Two- and three-quarter courses often require the purchase of only one book at the beginning of the course. Secondhand books can often be purchased at one of the various bookstores. Approximate annual cost of \$35 for the first two years and approximately \$12 for each of the last three years should represent maximum book expenses.\*

\* Altho sale of textbooks is not recommended it is one method of reducing this expense.

† For detailed information see Bulletin of General Information, page 57.

‡ For nonresidents of Minnesota, tuition fee is \$50.

**Cost of uniforms.**††—The student pays for her outdoor coat and for her first complete set of uniforms. The hospital replaces worn-out uniforms. This charge of approximately forty dollars (\$40) is payable at the end of the first month of the sixth quarter at the University when the order is sent to the manufacturer. If the student cancels registration before entering the hospital arrangements are made for the resale of the uniform at only a slight loss to the original purchaser.

Total uniform expense.....\$40.00††

Students may purchase uniforms second hand but cannot have replacement by hospital until such time as sets of new uniforms purchased by classmates require replacement.

At the time uniforms are purchased, students should provide themselves with name tapes for all pieces which are to be laundered. One hundred tapes should be sufficient. These may be purchased through the office of the School of Nursing.

**Course fee.**—In the case of students repeating courses failed in the School of Nursing, residents pay a fee of \$1 per clock hour and nonresidents a fee of \$1.75 per clock hour.

**Miscellaneous expense.**—This item of \$35 includes transportation while in the School of Nursing to and from classes at the University and to and from the field when assigned to field trips or to public health nursing.

**Graduation fees.**—The student registered in the five-year curriculum receives a diploma in nursing and a bachelor of science degree. The fee for each is \$7.50.

Total graduation fee.....\$15.00

**Board and room.**—Those students who live within commuting distance do not have this expense since they can live at home during the periods when they are not in hospital residence. There is no charge for board and room while in residence at the hospital. The cost of room and board varies widely.

Comstock Hall,† new residence hall for women, \$125 to \$130 depending upon the room selected, per quarter.

Sanford Hall,† residence hall for women, \$95 to \$120 depending upon the room selected, per quarter.

Co-operative cottages,† in which the students assist with work, \$60 to \$65 per quarter.

Rooming houses† for room per month, \$12 to \$15; for board, per week, \$6 to \$7 for two meals per day.

Some students earn their room and board in return for services given in private families. This may be done while taking academic classes but not while in the School of Nursing proper.

Those who plan to earn part of their expenses may receive information from the Employment Bureau, Room 9 Administration Building, University of Minnesota.

† For detailed information see Bulletin of General Information, pages 42-44.

†† Those students who elect public health nursing as their field of major interest in the fifth year pay approximately \$20 in addition for public health uniforms.

Affiliating students pay no tuition and complete maintenance is furnished them. Books amount to about \$20 for the year. Personal expenses can be determined best by the individual student.

For fee in postgraduate curricula see pages 38-39.

### *Three-Year Curriculum*

Estimate of total required university expense for entire three-year curriculum would vary from about \$175 for residents of the Twin Cities who live at home to about \$300 for *residents* who pay very liberally for board and room. *Nonresidents* should add \$23 to these sums. This estimate does not include personal expenses.

**Tuition fee.**—For the first quarter's work in the School of Nursing the tuition fee is \$27.‡ No tuition is charged during the period of hospital residence.

Total tuition fee.....\$27.00

**Incidental fee.**—This fee is the same as for students registered in the five-year curriculum and is charged for only the first quarter.

Total incidental fee.....\$8.50

**Matriculation deposit.**—Same as for students registered in the five-year curriculum. Ten dollars (\$10).

**Public health nursing field practice fee.**—Three dollars (\$3).

**Condition examination fee.**—One dollar (\$1).

**Cost of books.**—During the first quarter the cost of books is approximately \$15 as a maximum and during the remainder of the course an annual expense of \$10 would represent a maximum amount. Secondhand books can often be purchased at one of the various bookstores.

**Cost of uniforms.**—Same as for five-year students but payable at end of first month.

Total uniform expense.....\$40.00

**Course fee.**—In the case of students repeating courses failed in the School of Nursing, residents pay a fee of \$1 per clock hour and nonresidents a fee of \$1.75 per clock hour.

**Miscellaneous expense.**—This item of \$35 includes transportation while in the School of Nursing to and from classes at the University and to and from the field when assigned to public health nursing.

**Graduation fee.**—The student registered in the three-year curriculum receives a diploma in nursing, for which the fee is \$7.50.

**Board and room.**—Those students who live within commuting distance do not have this expense since they may live at home during the first quarter, but out-of-town students may find facilities in the approved rooming houses near the campus. Expenses vary from \$12 to \$15 a month for room and from \$6 to \$7 a week for board for two meals per day.

‡ For nonresidents of Minnesota, tuition fee is \$50.

## HEALTH REGULATIONS†

The University School of Nursing requires the five-year student *while on the campus and before transferring* to the School of Nursing to be vaccinated against smallpox and to be immunized against typhoid fever, diphtheria, and scarlet fever. The three-year student should comply with this requirement *before entering* the school. (Detailed instructions as prescribed by the University Health Service regarding immunization may, if desired, be secured from the School of Nursing by the applicant's physician.)

*Upon entrance the applicant must pass satisfactorily the physical examination including dental examination given by the University Health Service.* Students whose condition needs further observation may be admitted tentatively but must cancel if later findings prove them physically unfit for nursing. The increasing emphasis on the maintenance of health and the prevention of disease is bringing an equal demand that the nurse herself be physically fit.

All students receive in the respective hospitals an annual physical examination. In addition (a) a Mantoux test is made of all students on entrance and a chest X ray is taken in case of positive reaction. (b) One week preceding the tuberculosis service, a Mantoux test is also taken of students whose Mantoux tests were negative on entrance. All students having a positive reaction are given a chest X ray. Students with positive reaction receive four weeks' experience at Glen Lake Sanatorium; those with negative reaction receive two weeks' observation and experience at Glen Lake Sanatorium, one week at Lymanhurst Clinics (including home visits), and one week in related hospital clinics. (c) Three months after returning from the tuberculosis service, those whose Mantoux tests were negative before entering the tuberculosis service are given another Mantoux test. Those students with positive reactions receive a chest X ray at that time. A complete physical examination is given on completion of the course, including chest X ray for students having positive Mantoux reaction. Mantoux test and chest X rays are made routinely for postgraduate students on entrance only. However, any student will receive a chest X ray as often as necessary for the protection of the students and the hospitals. Through the University Health Service a special examination of feet of students is made and recommendation given for desirable types of shoes and, when indicated, for corrective foot exercises.

Students about whom it is decided that tonsillectomy or other surgery was indicated before admission to the school, or students under care of a private physician for some minor complaint which does not interfere with the practice of nursing but requires continued treatment, may be asked to pay for this care at the hands of the physician or surgeon of their choice.

A regular student in the School of Nursing who is disabled by continued illness shall be referred to her home or family as soon as she may be

† The regulations given here apply to postgraduate, as well as undergraduate, students except where otherwise indicated.



safely discharged from the hospital and permitted to travel, and shall thereafter be eligible for reinstatement under the same rules as apply to any other student. In any case, students must meet the cost of hospital care which is in excess of one month per year of residence in the school.

### GRADES

Students in the five-year curriculum are governed during the first five quarters by the regulations of the College of Science, Literature, and the Arts, and during the last three quarters by the regulations of the College of Education or of the Medical School (depending upon selected major), in regard to grades, credits, honor points, and so forth. Students receive grades in accordance with the general university plan. The passing grades used are A, B, C, D, in order of excellence. A grade of I (incomplete) is given when work is not completed on time, through no fault of the student, and must be made up within 30 days unless the time is extended by permission of the Students' Work Committee. A grade of E is a temporary grade which may be removed by satisfactorily passing a second examination, for which a fee of \$1 is charged. A grade of F in any class can be removed only by repeating the course. Students receiving a grade of F (failure) in any part of the clinical experience must repeat enough of the service to secure a passing grade.

### CONTINUATION IN SCHOOL

Because of the complicated schedules of clinical experience it is impossible to arrange irregular class schedules for students. For that reason, no student is allowed to register for the second quarter in the School of Nursing who has not satisfactorily completed the work of the first quarter; and no student may register for the third quarter who has not satisfactorily completed the second.

The faculty of the School of Nursing reserves the right to cancel the registration of any student who seems to them unsuited for the nursing profession or to remove any student connected with the school when, in their judgment, the interest of the school requires it.

### READMISSION

All students who miss more than a month of their work through illness or leave of absence will have to remain out of the school until such time as the class or clinical schedule can be adjusted to their needs. *Permission cannot be granted students to remain away for the purpose of caring for sick relatives or for other personal reasons.*

### REQUIREMENTS FOR GRADUATION

The Board of Regents of the University of Minnesota upon recommendation of the faculty of the School of Nursing, confers degrees and certificates as specified below.

## BACHELOR OF SCIENCE DEGREE AND GRADUATE IN NURSING

The degree of bachelor of science and of graduate in nursing will be granted those students who have completed satisfactorily the requirements of the five-year curriculum as outlined on pages 27 to 35. They must meet all requirements for the B.S. degree before they may count the three quarters in the College of Education or in the Medical School in their senior year as contributing toward the three-year requirement for the diploma of graduate in nursing. In other words, five-year students are not *eligible* for the graduate in nursing diploma until they are eligible for the B.S. degree.

## GRADUATE IN NURSING

The diploma of graduate in nursing will be granted those students who have completed satisfactorily the requirements of the three-year curriculum as outlined on pages 36-37. See also Class Curriculum and Clinical Experience on pages 29 to 31. They must have credit for the satisfactory completion of three full years in the nursing curriculum.

Students who take the five-year curriculum but do not complete its requirements may change their status to three-year students and receive the graduate in nursing diploma upon satisfactory completion of the requirements of the three-year curriculum.

Students who enter as three-year students holding a B.S. or B.A. degree before entering, may count a part of two quarters in the College of Education, Medical School, or Graduate School as a part of the three-year requirement, provided the courses they select have the approval of the faculty of the School of Nursing.

## BACHELOR OF SCIENCE DEGREE

The bachelor of science degree will be granted those graduate nurses who have completed satisfactorily the requirements for this degree as outlined on pages 27 to 35.

## STATE REGISTRATION

Nursing students completing either the five- or three-year curriculum are eligible at the age of twenty-one years to take the state board examination given by the Minnesota State Board of Nurse Examiners. Successful passing of this examination entitles the nurse to registration in Minnesota and makes her eligible for membership in her alumnae association (see below), and through her district and state association, in the national nursing organizations and the Red Cross Nursing Service. Graduates from the University of Minnesota School of Nursing are also eligible for registration in any part of the United States. (Those desiring registration in New York state must have completed two years of science in high school.)

## ALUMNAE ASSOCIATION

The purposes of the Alumnae Association are to promote the educational qualifications and proficiency of nurses, and to inculcate and disseminate high standards of ethical and professional conduct among persons engaged in the nursing profession.

The Alumnae Association has established an endowment fund which it continues to increase. A loan fund (see page 10) named to honor Richard Olding Beard (founder of the school and early leader in its development) and a fund which provides an annual lectureship, also honoring him, are derived from a portion of the income of the endowment fund.

The association also publishes the *Alumnae Quarterly* and an annual directory of members.

## CURRICULA

The School of Nursing administers, with the assistance of certain other schools and departments in the University, the following curricula:

1. Five-year curriculum
2. Three-year curriculum
3. Degree curriculum for graduate nurses
4. Affiliating curricula
5. Postgraduate curricula

### FIVE-YEAR CURRICULUM

The five-year combined Nursing and Arts Curriculum leads to a bachelor of science degree and a diploma of graduate in nursing. *Wherever possible, students should elect the five-year in preference to the three-year curriculum, because the preparation given is broader and better, and graduates of the five-year curriculum are in much greater demand than are those of the three-year curriculum.* The curriculum is planned to prepare the student not only for bedside nursing but also for administrative, supervising, and teaching positions in schools of nursing and hospitals; for such public health nursing positions as visiting nursing, school nursing, health teaching, infant welfare, rural and industrial nursing; and for combined positions in secondary schools involving both nursing and teaching.

#### PART I. COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

(Five quarters)

For the first five quarters of the five-year curriculum† in Nursing Education and Public Health Nursing the student is registered in the Junior College. She must complete the requirements listed below, and must earn an average of one honor point per credit.

English A-B-C (Freshman English, 15 credits) or English 4-5-6 (Freshman Composition, 9 credits) or exemption from the requirement.

Sociology 1 (Introduction to Sociology).

Psychology 1 and 2 (General Psychology).

Child Welfare 40 or Home Economics Education 90. (Child Training.)

Controlled electives: Any three of following courses: P.M.&P.H. 3, Personal Health; Physiol. 51,\* or 2, or 4,\* Human Physiology (see note below for preferred plan); H. Econ. 30 or 31, Introduction to Nutrition; Soc. 49, Social Pathology; Human Anat. 3, Elementary Anatomy; Bact. 101 and 102,\* Medical Bacteriology; or Bact. 53,\* or 1 (see note below for preferred plan); Physiol. 50,\* or 1. Physiological Chemistry.

\* These courses prerequisite Zoology 1-2-3, and two quarters of inorganic chemistry and Phys. 51 prerequisites Phys. 50 and Anatomy.

† For detailed information about the individual subjects of study in this curriculum (course numbers and titles, credits, prerequisites, schedule of hours and days, etc.), see the University's *Combined Class Schedule*.

Electives, exclusive of courses in physical education, to make a total of 75 credits for the work of the five quarters. (For each five honor points in excess of one honor point per credit, the number 75 is diminished by one.) The student's first choice of electives should include: Zool. 1-2-3, General Zoology (10 cred.); Chem. 1-2 or 4-5 or 6-7, General Inorganic Chemistry (8 or 10 cred., 10 credits in social science). Other recommended electives include Phil. 3, Ethics (5 cred.); Anthrop. 41, Introduction to Anthropology (5 cred.); and Zool. 22, Comparative Anatomy (5 cred.).

Physical Education, six quarters. One quarter of this requirement may be completed after registering in the School of Nursing. No credit is granted for physical education courses in the College of Science, Literature, and the Arts; but upon transfer to the College of Education, the student will receive the credits and honor points earned in those courses.

A suggested two-year sequence of required and elective courses, with the preferred courses in physiology and bacteriology follows. Note that student is registered in the School of Nursing during the sixth quarter (see Part II).

<i>First Year</i>		
<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
English 4f or Af	English 5w or Bw	English 6s or Cs
Chemistry 1f or 4f or 6f	Chemistry 2w or 5w or 7w	Sociology 1s
Zoology 1f	Zoology 2w	Zoology 3s
Preventive Medicine and Public Health 3f	Physical Education	Anatomy 3s
Physical Education	Electives*	Physical Education
Electives*		
<i>Second Year</i>		
<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
		(School of Nursing)
Psychology 1f	Psychology 2w	Sociology 49s
Physiology 50f	Physiology 51w	Bacteriology 102s
Physical Education	Bacteriology 101w or 53w	Physical Education
Electives*	Physical Education	Child Welfare 40s or
	Electives*	Home Econ. Ed. 90s
		Home Economics 30s or 31s
		History of Nursing 1s

## PART II. SCHOOL OF NURSING

(Ten quarters for five-year students, twelve quarters for three-year students)

Five-year students are admitted to the spring and fall quarters and remain in the School of Nursing ten quarters. Three-year students who have completed 75 or more college credits with an average of one honor point per credit, but who do not have the specific course requirements for entrance to the nursing portion of the five-year curriculum, are also admitted in the spring and fall quarters, tho the preferred entrance date to the School of Nursing both for these and the five-year students is the beginning of the spring quarter. All other three-year students are admitted in the fall quarter only. All three-year students remain in the school twelve quarters (three years). Sixty credits are granted for successful completion of Part II.

\* Electives should be chosen to make on the average a program of 15 credits per quarter in addition to physical education. Social science should be chosen in the freshman year if possible.

## CLASS CURRICULUM§

Five-year students transfer from the College of Science, Literature, and the Arts (see above) to the School of Nursing at the end of the fifth quarter. During the sixth quarter (first quarter in the School of Nursing) they complete, from the following list, any courses which they have not completed as the three (or more) controlled electives while in the College of Science, Literature, and the Arts:

*First Year—First Quarter*

Course No.	Title
Anat. 3*	Elementary Anatomy
P.M.&P.H. 3*	Personal Health
Soc. 49	Social Pathology
C.W. 40	Child Training
Nurs. 1	History of Nursing
Physiol. 1*†	Elements of Physiological Chemistry
Physiol. 2*†	Elements of Physiology
Bact. 1*†	Elementary Bacteriology
Nurs. 10	Introduction to Nutrition
Nurs. 12	Introduction to Nursing ( <i>May not be offered in 1942</i> )
	Electives to make a total of 15 credits.

*First Year—Second Quarter*

Course No.	Title	Class Hrs.	Lab. Hrs.	Total Hrs.
Nurs. 11	Foods and Nutrition .....	11	44	55
Nurs. 14	Introduction to the Medical Sciences .....	22	.....	22
Nurs. 15	Nursing Arts (including metrology).....	66	22	88
Nurs. 18	Principles of Medical and Surgical Nursing .....	44	.....	44
Pharm. 8	Elementary Pharmacology .....	22	22	44
	Total .....	165	88	253

*First Year—Third and Fourth Quarters¶*

Course No.	Title	Class Hrs.	Lab. Hrs.	Total Hrs.
Nurs. 16	Advanced Nursing Arts (including bandaging, massage, and metrology).....	33	11	44
Nurs. 19	Principles of Medical and Surgical Nursing .....	44	.....	44
Nurs. 41	Principles of Pediatrics and Pediatric Nursing .....	33	.....	33
	Total .....	110	11	121

\* These courses compose the first quarter's required curriculum for three-year students.

† These courses have preferred substitutes, namely: Physiology 50 and 51; Bacteriology 101-102 or 53; Home Economics 31 or 30; the first three of which prerequisite Zoology 1-2-3 and two quarters of inorganic chemistry. (See "Suggested Five-Year Program" for desirable sequence.)

§ Five-year students have fewer class hours or may substitute other courses because of having carried Physiology 2 or 4 or 51 and perhaps certain others of the required courses during the pre-nursing period.

¶ Slight alterations in this program may be necessary as a result of the revision of the curriculum.

## SCHOOL OF NURSING

*Second Year*

Course No.	Title	Class Hrs.	Total Hrs.
Med. 171	Descriptive Neuropsychiatry .....	33	33
Nurs. 1	History of Nursing (three-year students).....	11	11
Nurs. 20	Principles of Nursing in Conditions of the Skin.....	11	11
Nurs. 25	Principles of Orthopedics and Orthopedic Nursing.....	22	22
Nurs. 35	Principles of Communicable Disease Nursing.....	22	22
Nurs. 39	Principles of Nursing in Conditions of the Reproductive System .....	11	11
Nurs. 43	Principles of Obstetrics and Obstetric Nursing.....	22	22
Nurs. 45	First Aid .....	22	22
Nurs. 48	Principles of Care in Ear Conditions.....	11	11
Nurs. 49	Principles of Care in Eye Conditions.....	11	11
Nurs. 53	Field Practice in Public Health Nursing (five-year students) .....	33	33
	Total .....	209	209

*Third Year*

Course No.	Title	Class Hrs.	Total Hrs.
Nurs. 36	Principles of Tuberculosis and Tuberculosis Nursing	22	22
Nurs. 50	Survey of Professional Field (three-year students).....	22	22
Gen.Col. 41A-B	Practical Applications of Psychology (three-year students) .....	66	66
P.M.&P.H. 56	Introduction to Public Health Nursing (three-year students) .....	11	11
	Total .....	121	121

## CLINICAL EXPERIENCE

The clinical experience of the students begins in their second quarter in the school. Students are rotated from one hospital to another in order to give them complete clinical experience. The hospitals in which the students receive their clinical experience are as follows:

The University of Minnesota Hospitals, situated on the University campus, include the Elliot Memorial Hospital, the Cancer Institute, the Todd Memorial, and the Eustis Children's Hospital. They are supported by state funds and endowments. They care for patients sent in from all parts of the state. The daily average of patients from January 1 to December 31, 1940, was 378.7.

The Minneapolis General Hospital is supported by taxation, and cares principally for the indigent sick of the city of Minneapolis. It has a large number of accident and emergency cases and a wide variety of acute diseases. The daily average of patients from January 1 to December 31, 1940, was 484.3.

The Charles T. Miller Hospital, in St. Paul, has 50 beds for free patients and 150 beds for private and semi-private patients. The daily average patients from January 1 to December 31, 1940, was 185.9.

The Hennepin County Tuberculosis Sanatorium at Glen Lake, an institution of over 700 beds, caring for all types of tuberculosis, is affiliated with the School of Nursing to give the students experience in the care of tuber-

culous patients. Students are assigned for this experience in the latter half of their course.

In addition, students (all five-year and as many three-year students as the agencies can accommodate) are assigned to the Community Health Service of Minneapolis or the Family Nursing Service of St. Paul for field experience in public health nursing.

PART III. COLLEGE OF EDUCATION  
(Three quarters\*)

NOTE.—Part III is not required for three-year students.

The student selects one of two majors:

A. Nursing Education, which has in addition to the primary pattern two variants, namely: Child Health, and Nutrition. For any one of these three the student registers in the College of Education. The primary curriculum in Nursing Education prepares for nursing in institutions, for administration, or for teaching in hospitals and schools of nursing. The combination (1) with courses in Child Care (Institute of Child Welfare) prepares the nurse for work in pediatric wards or clinics, work with both well and sick children, or serves as excellent background for nurses who may later seek additional preparation for public health work with children. The combination (2) with Nutrition (Home Economics) prepares the nurse for any position in which more than ordinary mastery in this field is desirable.

Major Adviser: Katharine J. Densford.

A. Nursing Education Curriculum (primary pattern)

No.	Title	Credits
Ed. 51A and B	Introduction to Secondary School Teaching .....	6
Ed.T. 51A	Special Methods of Teaching in Schools of Nursing .....	3
Ed.T. 51B†	Special Methods of Teaching and Directed Teaching in Schools of Nursing .....	5
Nurs. 60	Ward Organization for Instructional Purposes .....	4 or 8
Nurs. 69	Survey of Conditions and Trends in Nursing .....	3
Nurs. 71	Curriculum Making in School of Nursing .....	3
	Electives‡ .....	11 or 15
	Education electives approved by adviser .....	3
	Total .....	45

\* All students must spend three full quarters in this portion of the curriculum, regardless of excessive academic work previously carried.

† Requirements for registration in Ed.T. 51B are as follows:

1. A passing grade in Ed. 51A and B.
2. Passing of the qualifying examination in English.
3. Attainment of a scholastic average of 1.5 in the field in which the practice teaching is to be done. A major portion of the work in the teaching field should be completed.
4. The recommendation of the subject-matter department in the major field.
5. Passing of the required speech test.

‡ By careful selection of these electives and with an additional quarter the public health nursing certificate may be earned. See the Bulletin of Preventive Medicine and Public Health.



## Variant for those interested in Child Care:†

No.	Title	Credits
Nursing Courses		
Nurs. 60	Ward Organization for Instructional Purposes.....	4
Nurs. 69	Survey of Conditions and Trends in Nursing.....	3
Nurs. 71	Curriculum Making in Schools of Nursing.....	3
Education Courses		
Ed.T. 51A	Special Methods of Teaching in Schools of Nursing.....	3
Ed. 51B	Introduction to Secondary School Teaching.....	3
Nursery School Courses		
Ed.T. 55	Principles of Early Childhood Education.....	3
Ed.T. 56	Permanent Play Materials .....	2
Ed.T. 57	Plastic Materials .....	3
Ed.T. 59	Story Telling for Young Children .....	2
Ed.T. 75	Methods and Observation in the Nursery School.....	3
Ed.T. 76A,B,C	Methods and Observation .....	3
Mu.Ed. 50A	Primary Methods .....	2
	Electives approved by major adviser.....	11
	<hr/>	<hr/>
	Total .....	45

## Variant for those interested in Nutrition:

Students taking this curriculum must have completed Home Economics 30, 2 cred., before entering the School of Nursing.

No.	Title	Credits
Nursing Courses		
Nurs. 60	Ward Organization for Instructional Purposes.....	4
Nurs. 69	Survey of Conditions in Nursing.....	3
Nurs. 71	Curriculum Making in Schools of Nursing.....	3
Education Courses		
Ed.T. 51A	Special Methods of Teaching in Schools of Nursing.....	3
Ed.T. 51B*	Special Methods of Teaching and Directed Teaching in Schools of Nursing .....	5
Ed. 51B	Introduction to Secondary School Teaching.....	3
	Electives in Education approved by adviser.....	9
Home Economics Courses		
Agr.Biochem. 4	Introduction to Organic and Biochemistry.....	5
H.E. 34	Nutrition Problems .....	4
H.E. 170	Nutrition of the Family .....	3
H.E. 173	Nutrition in Disease.....	3
	<hr/>	<hr/>
	Total .....	45

## Other Variants:

During the coming year offerings in additional fields of specialization will be made from such areas as physical therapy and selected sciences basic to nursing.

\* Requirements for registration in Ed.T. 51B are as follows:

1. A passing grade in the junior sequence in education.
2. Passing of the qualifying examination in English.
3. Attainment of a scholastic average of 1.5 in the field in which the practice teaching is to be done. A major portion of the work in the teaching field should be completed.
4. The recommendation of the subject-matter department in the major field.
5. Passing of the required speech test.

† The requirements for registration in Ed.T. 51B as indicated above must also be completed before students register for the last 30 credits in the Child Care Curriculum.

*B. Public Health Nursing* (primary pattern—student enrolled in Medical School)†§

Major Adviser: Mellie F. Palmer.

No.	Title	Credits
P.M.&P.H. 53	Elements of Preventive Medicine and Public Health.....	5
P.M.&P.H. 61	Mental Hygiene	} ..... 3
or 133	Mental Hygiene, Aspects of Public Health Nursing	
P.M.&P.H. 62-63	Principles of Public Health Nursing.....	6
P.M.&P.H. 65	Field Practice in School Nursing	} ..... 16
P.M.&P.H. 66	Field Practice in Rural Nursing	
P.M.&P.H. 67	Field Practice in Family Health Agency	
Soc. 90	Principles of Social Case Work	} ..... 3 or 5
or 129	Survey of Social Work	
	Electives in Child Welfare Group.....	3
	Courses in Social Science Group exclusive of Sociology.....	9
	Electives in Natural Science Group .....	14
	Electives from Dept. of P.M.&P.H.....	8 or more

Variant for those interested in School Nursing. (See the College of Education Bulletin.)

THREE-YEAR CURRICULUM

The three-year curriculum leads to the diploma of graduate in nursing. Candidates for the diploma of graduate in nursing must complete the curriculum of class work designated for three-year students, as outlined under Part II, page 28, and of clinical experience as given on pages 36-37. Candidates must complete the first quarter's class work and earn one honor point per credit before admission to the second quarter. In addition, an average of C must be maintained in the four basic sciences of anatomy, bacteriology, physiological chemistry, and physiology. A description of the clinical experience will be found on page 30. Any changes therefrom must have the approval of the Students' Work Committee of the School of Nursing. Graduates of this curriculum receive 60 blanket credits toward a bachelor of science degree in nursing education or public nursing.

DEGREE CURRICULUM FOR GRADUATE NURSES

CURRICULA FOR STUDENTS WHO ARE GRADUATES OF ACCREDITED SCHOOLS OF NURSING

Open to those who meet entrance requirements for specialized curricula of the College of Education (see page 31). Advanced credit for the professional nursing courses will be determined by the Committee on Evaluation of Nursing Credentials which will indicate any additional hospital services to be completed before credit is granted. Forty-five credits represent approximately the average advanced standing granted for a satisfactory course of study in a school of nursing.

† Because of the overcrowding in this field it may be necessary for some students to spend a sequence of summer, fall, and winter quarters on the campus rather than fall, winter, and spring. In these instances the additional summer fees will be required.

§ For students who have not completed 9 credits in social science and 14 credits in natural science it will be necessary to spend more than three quarters in this portion of the curriculum.

Candidates must conform to the College of Education regulation relative to total credits and honor points and are entitled to privilege of quality credit rule. Candidates must also meet the physical education requirements of the College of Education.

To secure a degree in the College of Education students must earn 185 credits and 185 honor points, and in addition must earn 1½ honor points for each credit in a major field.

Graduate work in fields related to nursing may be carried and a Master's degree earned by students who meet the requirements of the Graduate School. Programs should be made out in consultation with a major adviser in the department.

The amount and type of college courses to be required of each candidate are to be decided by her major adviser after consideration of a candidate's general education and experience. All programs must also be approved by the Students' Work Committee and the dean of the College of Education. As a rule, however, the following curricula meet the needs of the majority of students. Substitutions may be made by petition upon the recommendation of the major adviser and the Students' Work Committee of the College of Education.

Among the fields recommended for graduate work are bacteriology, education, pathology, educational personnel work, physiology, psychology, and social science.

#### A. Nursing Education

Major Adviser: Katharine J. Densford

Curriculum leading to a bachelor of science degree with a major in nursing education. Courses to be included in this program will be found in Part I and Part III A of the five-year curriculum (as given on pages 27, 28, and 31) plus Education 51A and Sociology 49 and sufficient electives as recommended by the major adviser to fulfill the total credit and honor point requirement.

#### B. Public Health Nursing

Major Adviser: Mellie F. Palmer

Curriculum leading to a bachelor of science degree with a major in public health nursing. In addition to the courses listed in Part III B of the five-year course (page 33) the following courses are required:

No.	Title	Credits
Eng. A, B, C or	Freshman English .....	15
Comp. 4-5-6	Freshman Composition .....	9
Soc. 1	Introduction to Sociology .....	5
Soc. 49	Social Pathology .....	3
Psy. 1-2	General Psychology .....	6
Bact. 53 or 101	General Bacteriology } Medical Bacteriology }	5
	Electives to make .....	180

For additional information see the Bulletin of the Department of Preventive Medicine and Public Health.

CLINICAL CURRICULUM AFTER FIRST SIX MONTHS\*†  
FIVE-YEAR CURRICULUM

FALL CLASS

Freshman Year

GROUP 1		GROUP 2		GROUP 3		GROUP 4	
Title	Wks.	Title	Wks.	Title	Wks.	Title	Wks.
Med. Nurs.	4	Med. Nurs.	4	Surg. Nurs.	4	Surg. Nurs.	8
Surg. Nurs.	6	Surg. Nurs.	6	Med. Nurs.	6	Med. Nurs.	6
Oper. Room	8	Oper. Room	8	Psych. Nurs.	6	Diet K.	5
Vac.	2	Vac.	2	Oper. Room	8	Vac.	2
Ped. Nurs.	6	Ped. Nurs.	6	Vac.	2	Oper. Room	5

Junior Year

Ped. Nurs.	6	Ped. Nurs.	6	Ped. Nurs.	10	Oper. Room	3
Obst. Nurs.	12	Obst. Nurs.	12	Obst. Nurs.	12	Ped. Nurs.	12
Psych. Nurs.	6	Psych. Nurs.	6	Com. Dis.	6	Obst. Nurs.	12
Com. Dis.	6	Diet K.	5	Tbc. Nurs.	4	Psych. Nurs.	6
P. H. Nurs.	6	Com. Dis.	6	Out-Patient	4	Surg. Nurs.	4
Vac.	4	Out-Patient	4	Gyn. Nurs.	4	Com. Dis.	6
Tbc. Nurs.	4	Gyn. Nurs.	4	P. H. Nurs.	6	Vac.	4
Pri. Pat.	6	Tbc. Nurs.	4	Vac.	4	Out-Patient	4
Diet K.	2	Vac.	4	Med. Nurs.	2	P. H. Nurs.	1
		Surg. Nurs.	1				

Senior Year

Out-Patient	4	Surg. Nurs.	7	Med. Nurs.	1	P. H. Nurs.	5
Diet K.	3	P. H. Nurs.	6	Surg. Nurs.	7	Tbc. Nurs.	4
Gyn. Nurs.	4	Pri. Pat.	6	Diet K.	5	Gyn. Nurs.	4
Med. Nurs.	6	Med. Nurs.	6	Pri. Pat.	6	Med. Nurs.	4
Surg. Nurs.	8	Vac.	1	Med. Nurs.	3	Surg. Nurs.	2
Vac.	1	Campus	26	Surg. Nurs.	3	Pri. Pat.	6
Campus	26	(Incl. 3 wks. vac.)		Vac.	1	Vac.	1
(Incl. 3 wks. vac.)				Campus	26	Campus	26
				(Incl. 3 wks. vac.)		(Incl. 3 wks. vac.)	

Freshman Year

GROUP 5		GROUP 6		GROUP 7		GROUP 8	
Title	Wks.	Title	Wks.	Title	Wks.	Title	Wks.
Med. Nurs.	10	Surg. Nurs.	10	Med. Nurs.	6	Surg. Nurs.	10
Surg. Nurs.	3	Med. Nurs.	8	Surg. Nurs.	10	Med. Nurs.	4
Diet K.	5	Vac.	2	Vac.	2	Diet K.	5
Vac.	2	Psych. Nurs.	6	Psych. Nurs.	6	Vac.	2
Psych. Nurs.	6	Pri. Pat.	2			Pri. Pat.	5
Oper. Room	4						

Junior Year

Oper. Room	4	Oper. Room	8	Pri. Pat.	4	Pri. Pat.	1
Ped. Nurs.	12	Ped. Nurs.	12	Diet K.	5	Surg. Nurs.	2
Obst. Nurs.	12	Obst. Nurs.	12	Oper. Room	8	Med. Nurs.	3
Com. Dis.	6	Pri. Pat.	6	Ped. Nurs.	12	Psych. Nurs.	6
Surg. Nurs.	6	Vac.	4	Obst. Nurs.	12	Oper. Room	8
Vac.	4	Com. Dis.	6	Vac.	4	Ped. Nurs.	12
Tbc. Nurs.	4	Gyn. Nurs.	4	Surg. Nurs.	4	Obst. Nurs.	12
Out-Patient	4			Com. Dis.	3	Vac.	4
						Com. Dis.	4

Senior Year

Gyn. Nurs.	4	Diet K.	5	Com. Dis.	3	Com. Dis.	2
Surg. Nurs.	5	Med. Nurs.	2	Out-Patient	4	Tbc. Nurs.	4
P. H. Nurs.	6	Surg. Nurs.	4	Gyn. Nurs.	4	P. H. Nurs.	6
Pri. Pat.	6	Out-Patient	4	Tbc. Nurs.	4	Gyn. Nurs.	4
Med. Nurs.	4	P. H. Nurs.	6	P. H. Nurs.	6	Out-Patient	4
Vac.	1	Tbc. Nurs.	4	Med. Nurs.	4	Med. Nurs.	3
Campus	26	Vac.	1	Vac.	1	Surg. Nurs.	2
(Incl. 3 wks. vac.)		Campus	26	Campus	26	Vac.	1
		(Incl. 3 wks. vac.)		(Incl. 3 wks. vac.)		Campus	26
						(Incl. 3 wks. vac.)	

\* Three-year students who (because of overcrowding in the public health nursing agencies) cannot be accepted for field practice receive in lieu thereof one month's experience in the nursery school plus two additional weeks in the out-patient department.

† Suitable substitutes for students not receiving full assignment to tuberculosis experience are approved by the faculty.

CLINICAL CURRICULUM AFTER SIX MONTHS—THREE-YEAR CURRICULUM\*†‡

FALL CLASS†§

*Freshman Year*

GROUP 1		GROUP 2		GROUP 3		GROUP 4		GROUP 5		GROUP 6	
Title	Wks.	Title	Wks.	Title	Wks.	Title	Wks.	Title	Wks.	Title	Wks.
Med. Nurs.	4	Med. Nurs.	4	Surg. Nurs.	4	Surg. Nurs.	8	Med. Nurs.	6	Surg. Nurs.	6
Surg. Nurs.	6	Surg. Nurs.	6	Med. Nurs.	6	Med. Nurs.	6	Surg. Nurs.	3	Med. Nurs.	10
Oper. Room	8	Oper. Room	8	Psych. Nurs.	6	Diet K.	5	Diet K.	5	Vac.	2
Vac.	2	Vac.	2	Oper. Room	8	Vac.	2	Vac.	2	Psych. Nurs.	6
Ped. Nurs.	6	Ped. Nurs.	6	Vac. Room	2	Oper. Room	5	Psych. Nurs.	6	Oper. Room	4

*Junior Year*

Ped. Nurs.	6	Ped. Nurs.	6	Ped. Nurs.	10	Oper. Room	3	Oper. Room	4	Oper. Room	8
Obst. Nurs.	12	Obst. Nurs.	12	Obst. Nurs.	12	Ped. Nurs.	12	Ped. Nurs.	12	Ped. Nurs.	12
Psych. Nurs.	6	Psych. Nurs.	6	Com. Dis.	6	Obst. Nurs.	12	Obst. Nurs.	12	Obst. Nurs.	12
Com. Dis.	6	Diet K.	5	Tbc. Nurs.	4	Psych. Nurs.	6	Com. Dis.	6	Pri. Pat.¶	12
P. H. Nurs.	6	Com. Dis.	6	Out-Patient	4	Surg. Nurs.	4	Surg. Nurs.	6	Vac.	4
Vac.	4	Out-Patient	4	Gyn. Nurs.	4	Com. Dis.	6	Vac.	4	Com. Dis.	4
Tbc. Nurs.	4	Gyn. Nurs.	4	P. H. Nurs.	6	Vac.	4	Tbc. Nurs.	4		
Pri. Pat.¶	8	Tbc. Nurs.	4	Vac.	4	Out-Patient	4	Out-Patient	4		
		Vac.	4	Med. Nurs.	2	P. H. Nurs.	1				
		Surg. Nurs.	1								

*Senior Year*

Out-Patient	4	Surg. Nurs.	7	Med. Nurs.	1	P. H. Nurs.	5	Gyn. Nurs.	4	Com. Dis.	2
Pri. Pat.¶	4	P. H. Nurs.	6	Surg. Nurs.	7	Tbc. Nurs.	4	Surg. Nurs.	5	Gyn. Nurs.	4
Diet K.	5	Pri. Pat.¶	12	Diet K.	5	Gyn. Nurs.	4	P. H. Nurs.	6	Diet K.	5
Gyn. Nurs.	4	Med. Nurs.	6	Pri. Pat.¶	12	Med. Nurs.	4	Pri. Pat.¶	12	Med. Nurs.	2
Med. Nurs.	10	Surg. Nurs.	10	Med. Nurs.	3	Surg. Nurs.	2	Med. Pat.¶	4	Surg. Nurs.	4
Surg. Nurs.	8	Med. Nurs.	4	Surg. Nurs.	3	Pri. Pat.¶	12	Surg. Nurs.	10	Out-Patient	4
Med. Nurs.	9	Vac.	2	Med. Nurs.	9	Med. Nurs.	9	Med. Nurs.	9	P. H. Nurs.	6
Surg. Nurs.	10	Med. Nurs.	5	Surg. Nurs.	10	Surg. Nurs.	3	Vac.	2	Tbc. Nurs.	4
Vac.	2			Vac.	2	Vac.	2			Surg. Nurs.	10
						Surg. Nurs.	7			Vac.	2
										Med. Nurs.	9

NOTE.—In the shorter services certain rotation of students takes place which results in slight variation from the schedule—for instance in a three-month period including Gynecology, Diet Kitchen, and Surgical Nursing. Other variations may be made necessary by limitation of clinical field, illness of students, or other emergencies, but the above schedule is followed as closely as possible.

\* Three-year students who (because of overcrowding in the public health nursing agencies) cannot be accepted for field practice receive in lieu thereof one month's experience in the nursery school plus two additional weeks in the out-patient department.

† October to December—classes only; January to March—part-time practice in medical and surgical nursing.

‡ The class and clinical curriculum for the class entering the beginning of the spring quarter is similar to that for the class in the fall quarter with the exception of vacations which consist of one month in the junior and one in the senior year.

¶ Clinical experience in the care of private patients will be in the departments of medical and surgical nursing.

†† Suitable substitutes for students not receiving full assignment to tuberculosis experience are approved by the faculty.

CLINICAL CURRICULUM AFTER SIX MONTHS—THREE-YEAR CURRICULUM\*††

FALL CLASS†§

*Freshman Year*

GROUP 7	GROUP 8	GROUP 9	GROUP 10	GROUP 11	GROUP 12
Title Wks.	Title Wks.	Title Wks.	Title Wks.	Title Wks.	Title Wks.
Med. Nurs. .... 8	Med. Nurs. .... 6	Surg. Nurs. ....10	Surg. Nurs. ....12	Med. Nurs. .... 6	Surg. Nurs. ....10
Surg. Nurs. .... 4	Surg. Nurs. ....10	Med. Nurs. .... 4	Med. Nurs. ....12	Surg. Nurs. ....14	Med. Nurs. .... 8
Pri. Pat.¶ .....12	Vac. .... 2	Diet K. .... 5	Vac. .... 2	Vac. .... 2	Diet K. .... 5
Vac. .... 2	Psych. Nurs. .... 6	Vac. .... 2		Diet K. .... 4	Vac. .... 2
	Pri. Pat.¶ ..... 2	Pri. Pat.¶ ..... 5			Med. Nurs. .... 1

*Junior Year*

Psych. Nurs. .... 6	Pri. Pat.¶ ..... 10	Pri. Pat.¶ ..... 7	Diet K. .... 5	Diet K. .... 1	Med. Nurs. .... 3
Oper. Room .... 8	Diet K. .... 5	Surg. Nurs. .... 2	Pri. Pat.¶ .....12	Psych. Nurs. .... 6	Pri. Pat.¶ .....12
Ped. Nurs. ....12	Oper. Room .... 8	Med. Nurs. .... 3	Oper. Room .... 8	Pri. Pat.¶ .....12	Psych. Nurs. .... 6
Obst. Nurs. ....12	Ped. Nurs. ....12	Psych. Nurs. .... 6	Psych. Nurs. .... 6	Oper. Room .... 8	Oper. Room .... 8
Com. Dis. .... 6	Obst. Nurs. ....12	Oper. Room .... 8	Ped. Nurs. ....12	Ped. Nurs. ....12	Ped. Nurs. ....12
Vac. .... 4	Vac. .... 4	Ped. Nurs. ....12	Vac. .... 4	Vac. .... 4	Vac. .... 4
Surg. Nurs. .... 4	Surg. Nurs. .... 1	Obst. Nurs. .... 6	Obst. Nurs. .... 5	Obst. Nurs. .... 9	Obst. Nurs. .... 7
		Vac. .... 4			
		Obst. Nurs. .... 4			

*Senior Year*

Out-Patient ..... 4	Surg. Nurs. .... 3	Obst. Nurs. .... 2	Obst. Nurs. .... 7	Obst. Nurs. .... 3	Obst. Nurs. .... 5
P. H. Nurs. .... 6	Com. Dis. .... 6	Com. Dis. .... 6	Com. Dis. .... 6	Med. Nurs. .... 4	Surg. Nurs. .... 4
Surg. Nurs. .... 6	Out-Patient ..... 4	Tbc. Nurs. .... 4	Tbc. Nurs. .... 4	Com. Dis. .... 6	Com. Dis. .... 6
Med. Nurs. .... 2	Gyn. Nurs. .... 4	P. H. Nurs. .... 6	P. H. Nurs. .... 6	Tbc. Nurs. .... 4	Gyn. Nurs. .... 4
Diet K. .... 5	Tbc. Nurs. .... 4	Gyn. Nurs. .... 4	Gyn. Nurs. .... 4	P. H. Nurs. .... 6	Out-Patient ..... 4
Tbc. Nurs. .... 4	P. H. Nurs. .... 6	Out-Patient ..... 4	Gyn. Nurs. .... 4	Out-Patient ..... 4	P. H. Nurs. .... 6
Gyn. Nurs. .... 4	Med. Nurs. .... 4	Med. Nurs. .... 3	Out-Patient ..... 4	Gyn. Nurs. .... 4	Gyn. Nurs. .... 4
Surg. Nurs. ....10	Surg. Nurs. ....10	Surg. Nurs. .... 2	Med. Nurs. .... 7	Surg. Nurs. ....10	Med. Nurs. .... 7
Med. Nurs. .... 9	Vac. .... 2	Med. Nurs. .... 9	Surg. Nurs. .... 8	Vac. .... 2	Vac. .... 2
Vac. .... 2	Med. Nurs. .... 9	Vac. .... 2	Vac. .... 2	Med. Nurs. .... 9	Surg. Nurs. ....10
		Surg. Nurs. ....10			

NOTE.—In the shorter services certain rotation of students takes place which results in slight variation from the schedule—for instance in a three-month period including Gynecology, Diet Kitchen, and Surgical Nursing. Other variations may be made necessary by limitation of clinical field, illness of students, or other emergencies, but the above schedule is followed as closely as possible.

\* Three-year students who (because of overcrowding in the public health nursing agencies) cannot be accepted for field practice receive in lieu thereof one month's experience in the nursery school plus two additional weeks in the out-patient department.

† October to December—classes only; January to March—part-time practice in medical and surgical nursing.

§ The class and clinical curriculum for the class entering the beginning of the spring quarter is similar to that for the class in the fall quarter with the exception of vacations which consist of one month in the junior and one in the senior year.

¶ Clinical experience in the care of private patients will be in the departments of medical and surgical nursing.

†† Suitable substitutes for students not receiving full assignment to tuberculosis experience are approved by the faculty.

## AFFILIATIONS

Because of the large number of patients and the wide variety of illness manifested in these patients the school is able to offer affiliation in certain services to other schools of nursing desiring additional practice for their students.

Services in which other schools may arrange affiliations are medical, surgical, pediatric, obstetric, communicable disease, and out-patient departments. To schools sending students for a period of one year it is possible to include certain additional elective services.

The terms of affiliation are agreed upon between the university school and the school sending students. A copy of the conditions of affiliation will be sent to any school interested upon request to the director, School of Nursing, University of Minnesota. The length of affiliation varies from three months in the city of Minneapolis to six months or one year for schools outside the city. Schools desiring affiliation must be accredited schools and be connected with hospitals which are approved by the American College of Surgeons as well as by the American Hospital Association.

## POSTGRADUATE CURRICULA

Among the opportunities offered through postgraduate courses are the following:

1. To prepare for head nurse positions, combining proficiency in nursing, teaching, and administration.
2. To become acquainted with the scientific, social, and preventive aspects of advanced nursing in clinical fields.
3. To carry related university courses giving credit toward a degree.

Postgraduate courses are offered in communicable disease, medical, obstetric, pediatric, and surgical nursing, and one in operating room technique, teaching, and administration. Courses in orthopedic and eye nursing (somewhat different in plan from above) are available through the Department of Preventive Medicine and Public Health.

A program of academic study in the University is arranged for each field of postgraduate work, but may be modified by petition to meet the needs of the individual student and to take into consideration her interests and lines of development. All clinical subjects in the School of Nursing are also available for election. (For admission requirements see page 18.)

The clinical experience of the postgraduate students is planned so as to include all available subdivisions of the various fields. The University and Minneapolis General Hospitals are available as fields for clinical experience. Students taking surgical nursing and operating room technique and administration receive their clinical experience in the University of Minnesota Hospitals; those in the medical and obstetric curricula receive their clinical experience in the Minneapolis General Hospital; those in the pediatric curriculum are assigned by the Students' Work Committee, half going to the University of Minnesota Hospitals and the other half to the Minneapolis General Hospital. Only a limited number of applicants can be accepted

in any one quarter. Students must, before the end of their third quarter in the school, be recommended by the faculty for administrative experience. Those not so recommended will be expected to withdraw from the course.

Slight variations in schedule may be made necessary by limitation of clinical field, illness of students, or other emergencies, but the schedules as outlined on pages 40-43 are followed as nearly as possible.

Postgraduate students pay a \$10 deposit fee to the registrar for reservation of place. This fee is retained by the University if the applicant does not accept the appointment as agreed upon. Postgraduate students receive full maintenance except when they are not giving nursing care in the hospital (as for instance nursery school observation) during which time the hospital does not provide maintenance. Such periods are clearly indicated in the outlines of the separate courses. During these periods the students may pay the hospital \$10 weekly for maintenance or live elsewhere if they prefer.

Students wear their own graduate nurse uniforms while in the hospital. Laundry is included in maintenance. As registrants in the School of Nursing, postgraduate students pay no tuition fee but do pay a deposit fee of \$5 on entrance, to be refunded at completion of the course if there are no charges against it. Postgraduate students who are desirous of transferring such college credits as may be counted for the bachelor of science degree pay the College of Education tuition fee (i.e., \$1.75 to \$3.50 per credit) at the time they transfer their credits from the School of Nursing to the College of Education, which college grants the degree. The following curricula do not provide for courses during the second summer term. In cases of students whose clinical curriculum allows, a course may be taken during the second term of the Summer Session by paying the required fee. Occasionally, also, additional courses may be carried in the General Extension Division by paying the required fee. Students in residence at the Minneapolis General Hospital pay carfare to and from university classes.

For students who continue work toward a degree six additional credits will be given by the Committee on Evaluation of Nursing Credits for the clinical portion of the programs after the satisfactory completion of any postgraduate curriculum.

### SUMMER COURSES

Summer courses for graduate nurses are offered during the first term (six weeks) of the Summer Session in the School of Nursing in co-operation with the Department of Preventive Medicine and Public Health. Whenever possible, guest instructors outstanding in their respective fields are added to the regular faculty for these courses. Courses offered cover such subjects as ward administration, teaching, supervision, administration in schools of nursing, and public health nursing in its various phases. Some public health nursing courses are also offered in the second term of the Summer Session.

A special summer announcement describing these courses can be had upon request to the director.



**POSTGRADUATE COURSE IN COMMUNICABLE DISEASE NURSING**

		<i>Fall</i>		
	<i>Class Curriculum</i>	<i>Credits</i>	<i>Clinical Curriculum</i>	
Subject				
Bact. 53, General Bacteriology .....		5*	Communicable Disease Ward	
Nu. 35, Principles of Communicable Disease Nursing (22 hrs.)				
Elective .....		5-8*		21 hours per week
<hr/>				
<i>Winter</i>				
Nu. 72, Teaching and Supervision in Schools of Nursing .....		3*	Pediatric Out-Patient Department	
Elective .....		3*	Observation in Laboratory Communicable Disease Ward	36 hours per week
<hr/>				
<i>Spring</i>				
Nu. 60, Ward Organization for Instructional Purposes .....		4*	Tuberculosis Sanatorium Venereal Out-Patient Department	
P.M.&P.H. 60, Tuberculosis and Its Control .....		2*	Dermatological and Out-Patient Department Communicable Disease Ward Elective	36 hours per week
<hr/>				
<i>Summer</i>				
No classes			Administration	48 hours per week

**POSTGRADUATE COURSE IN MEDICAL NURSING**

		<i>Fall</i>		
	<i>Class Curriculum</i>	<i>Credits</i>	<i>Clinical Curriculum</i>	
Subject				
Bact. 53, General Bacteriology .....		5*	Medical Ward	
or				
Physiol. 2, Elements of Physiology.....		4*		
Nu. 19, Principles of Medical and Surgical Nursing (44 hrs.)				
Elective .....		3-5*		21 hours per week
<hr/>				
<i>Winter</i>				
Nu. 72, Teaching and Supervision in Schools of Nursing .....		3*	Out-Patient Department Communicable Disease Ward	
Nu. 18, Principles of Medical and Surgical Nursing (44 hrs.)			Gynecological Ward Receiving Ward	
Nu. 35, Principles of Communicable Disease Nursing (22 hrs.)				
Elective .....		2*		36 hours per week
<hr/>				
<i>Spring</i>				
Nu. 60, Ward Organization for Instructional Purposes .....		4*	Diet Laboratory Medical Ward	
Elective .....		2-3*	Tuberculosis Sanatorium	36 hours per week
<hr/>				
<i>Summer</i>				
No classes			Administration	48 hours per week

\* Credits may be transferred to the College of Education.

**POSTGRADUATE COURSE IN OBSTETRIC NURSING**

		<i>Fall</i>		
	<i>Class Curriculum</i>	<i>Credits</i>		<i>Clinical Curriculum</i>
Subject				
Bact. 53, General Bacteriology.....		5*		Obstetric Ward
Nu. 43, Principles of Obstetrics and Obstetric Nursing (22 hrs.)				Nursery for Newborn Infants
Elective .....		4 or 5*		21 hours per week
<i>Winter</i>				
Nu. 72, Teaching and Supervision in Schools of Nursing.....		3*		Communicable Disease Ward
P.M.&P.H. 58, Maternal and Child Hygiene .....		2*		Gynecological Ward
Nu. 35, Principles of Communicable Disease Nursing (22 hrs.)				Delivery and Labor Room
Lectures in Anesthesia (7 hrs.)				36 hours per week
<i>Spring</i>				
Nu. 60, Ward Organization for In- structional Purposes .....		4*		Out-Patient Department--prenatal clinic and visiting in homes
Elective .....		2-3*		Nursery for Premature Infants
				Obstetric Ward
				Delivery and Labor Room
				Experience in Administration of Ether
				36 hours per week
<i>Summer</i>				
No classes				Administration
				48 hours per week

**POSTGRADUATE COURSE IN PEDIATRIC NURSING**

		<i>Fall</i>		
	<i>Class Curriculum</i>	<i>Credits</i>		<i>Clinical Curriculum</i>
Subject				
C.W. 40, Child Training.....		3*		Medical Ward
Nu. 41, Principles of Pediatrics and Pediatric Nursing (33 hrs.)				Surgical Ward
Elective .....		5-7*		Receiving Room or Treatment Room
				Out-Patient Department
				21 hours per week
<i>Winter</i>				
Nu. 72, Teaching and Supervision in Schools of Nursing.....		3*		Nursery for Premature Infants
Nu. 35, Principles of Communicable Disease Nursing (22 hrs.)				Infant Ward, including Milk Laboratory
Elective .....		3-5*		Communicable Disease Ward
				36 hours per week
<i>Spring</i>				
Nu. 60, Ward Organization for In- structional Purposes .....		4*		Nursery for Newborn Infants
Elective .....		3*		Orthopedic Ward and Physiotherapy De- partment
				Nursery School
				Medical Ward, including Diet Laboratory
				Elective (2 weeks)
				36 hours per week
<i>Summer</i>				
No classes				Administration
				48 hours per week

\* Credits may be transferred to the College of Education.

POSTGRADUATE COURSE IN SURGICAL NURSING

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*Fall*

<i>Class Curriculum</i>	<i>Credits</i>	<i>Clinical Curriculum</i>
Subject		
Physiol. 2, Elements of Physiology.....	4*	Surgical Ward
or		Surgical Tuberculosis Ward
Physiol. 4, Human Physiology.....	4	Ward for Gastric Surgery
or		Observation in Sterile Supply Room
Bact. 53, General Bacteriology .....	5	
Elective .....	5-8*	21 hours per week

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*Winter*

Nu. 72, Teaching and Supervision in Schools of Nursing .....	3*	Treatment Room
Nu. 23, Massage (11 hrs.)		Observation in Main Operating Room
Nu. 52, Advanced Surgical Nursing (11 hrs.)		Eye, Ear, Nose, and Throat Ward
Elective .....	3-5*	Eye, Ear, Nose, and Throat Treatment Room
		Ward for Neurological and Tumor Sur- gery
		36 hours per week

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*Spring*

Nu. 60, Ward Organization for In- structional Purposes .....	4*	Out-Patient Department
Elective .....	2-3*	Physiotherapy Department
		Orthopedic Ward
		Gynecological Ward
		Urological Ward
		36 hours per week

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*Summer*

No classes	Administration	48 hours per week
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\* Credits may be transferred to the College of Education.

POSTGRADUATE COURSE IN OPERATING ROOM TECHNIQUE, TEACHING, AND ADMINISTRATION†

	FALL	WINTER	SPRING	SUMMER
Class	<i>First Quarter</i>		<i>Third Quarter</i>	
entering	Subject Physiol. 2, Elements of Physi- ology ..... 4*	Subject Bact. 53, General Bacteriology 5*	Subject Nu. 56, Operating Room Ad- ministration (22 hrs.) ..... 2*	Subject No classes
fall	Anat. 3, Elementary Anatomy Nu. 55, Operating Aseptic Technique (11 hrs.) ..... 3*	Elective ..... 3*	Elective ..... 3*	
quarter	Nu. 72, Teaching and Super- vision in Schools of Nursing Elective ..... 3*			
Class	<i>Fourth Quarter</i>		<i>Second Quarter</i>	
entering	No classes		Physiol. 2, Elements of Physi- ology ..... 4*	<i>Third Quarter</i> Nu. 72, Teaching and Super- vision in Schools of Nursing 5*
winter			or	
quarter			Anat. 3, Elementary Anatomy Nu. 56, Operating Room Ad- ministration (22 hrs.) ..... 2*	
			Elective ..... 2*	
Class	<i>Third Quarter</i>		<i>First Quarter</i>	
entering	Bact. 53, General Bacteriology 5*	No classes	Physiol. 2, Elements of Physi- ology ..... 4*	<i>Second Quarter</i> Nu. 72, Teaching and Super- vision in Schools of Nursing 5*
spring	Nu. 56, Operating Room Ad- ministration (22 hrs.) ..... 2*		or	
quarter			Anat. 3, Elementary Anatomy Nu. 55, Operating Aseptic Technique (11 hrs.) ..... 3*	
			Elective ..... 3-5*	
Class	<i>Second Quarter</i>		<i>Fourth Quarter</i>	
entering	Physiol. 2, Elements of Physi- ology ..... 4*	Bact. 53, General Bacteriology 5*	No classes	
summer	or	Elective ..... 3*		
quarter	Anat. 3, Elementary Anatomy Nu. 56, Operating Room Ad- ministration ..... 2*			

\* Credits may be transferred to the College of Education.

† Clinical experience during the first quarter is scheduled in general surgery and urological surgery; during the second and third quarters in eye, ear, nose, and throat surgery, gynecological and orthopedic surgery, surgical ward, and surgical supply room; and during the fourth quarter in administration and elective service.

## DESCRIPTION OF COURSES

Anat. 3f,s. Elementary Anatomy. Brief résumé of cytology and embryology. More detailed study of the gross anatomy and histology of the organ systems by means of lectures, laboratory studies, and demonstrations. (3 cred.; 44 hrs.)

3f	Lect.	Sec. A,B C,D,E	I VI	M T	Ar Ar
	Lab. and Rec.	Sec. A B C D E	I,II,III II, III, IV VII,VIII,IX VI,VII,VIII VII,VIII,IX	T T T Th Th	Ar Ar Ar Ar Ar
3s	Lect.	Sec. C,D	VI	T	Ar
	Lab. and Rec.	Sec. C D	VII,VIII,IX VI,VII,VIII	T Th	Ar Ar

Bact. 1f,s,‡ Elementary Bacteriology. Principles of bacteriology, general survey of pathogenic bacteria, molds, protozoa, and viruses. Elements of immunity. Sanitary analysis of water and milk. Germicides. Bacterial food poisoning. (4 cred.; 66 hrs.)

1f	Lect. II	MWF			
	Lab. Secs.	A, B III C, D IV	MWF MWF		
	Sec. E	III S VI Th VII T			

Bact. 1s. Elements of Bacteriology. (Exclusively for students in the three-year curriculum in Nursing.) (4 cred.; no prereq.)

Lect.	III	MWF	MH
Lab.	IV	MWF	MH

Bact. 53f,w,s. General Bacteriology. (5 cred.; soph. with a C average in the prerequisite courses, jr., sr.; prereq. 10 cred. in chem. and 4 cred. in bot. or zool.; VII,VIII,IX MWF MH)

Bact. 101w. Medical Bacteriology. (5 cred.; jr., sr., grad.; prereq. Zool. 1-2-3 and 10 cred. in chem.)

Lect.	IV	MWF	MH
Lab. Sec. 1	I,II	MWF	MH
2	I,II	TThS	MH

Bact. 102s. Medical Bacteriology. (4 cred.; jr., sr., grad.; prereq. 101)

Lect.	I	MWF	MH
Lab. Sec. 1	II,III	M	MH
	II	WF	MH
2	I,II	T	MH
	I	ThS	MH

C.W. 40f. Child Training. (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)

Lect.	V	MW	202Pt
	and one hour of observation to be arranged		

‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing \$1.50 microscope card from bursar.

- C.W. 40w. Child Training. (See 40f)  
Lect. IV MW 106Pt  
and one hour of  
observation to be  
arranged
- C.W. 40s. Child Training. (See 40f)  
Lect. V TTh 202Pt  
and one hour of  
observation to be  
arranged
- Ed.T.51Aw.\*‡‡ Special Methods of Teaching in Schools of Nursing. Principles underlying clinical and classroom teaching in schools of nursing. Planning and evaluating instruction. (3 cred.; III MWF.)
- Ed.T.51Bs.\*‡‡ Special Methods of Teaching and Directed Teaching in Schools of Nursing. Observation and study of principles of teaching applied in the nursing school situation. Supervised practice in teaching of nursing subjects. (5 cred.; III MWF and 2 hrs. ar.)
- Gen.Col.2f,w. Practical Applications of Psychology. The aim of this course is to present a picture of the ways in which the human being meets the problems of his environment and develops the many traits which are called personality. (6 cred.; 66 hrs.; 1:00-2:20 p.m. MWF.)
- Med.171w,su. Principles of Neuropsychiatry. This course deals with the diagnosis, treatment, nursing care, and prevention of (1) neurological disorders; and (2) of organic and functional psychoses, with emphasis upon the relation of personality disorders to physical disorders, to family and community problems, etc. Lectures, clinics, ward nursing classes, case study conferences, demonstrations, and excursions. (3 cred.; 33 hrs.)  
171w Sec. 1 4:00 p.m. MWF  
2 3:00 p.m. MWF  
171su Sec. 1 3:00-4:20 p.m. MWF  
2 VIII MTWThF
- Nurs. 1f,s. History of Nursing. A brief historical survey of nursing serving as a basis for study of problems of the present day. (1 cred.; 11 hrs.)  
1f VII W  
1s Sec. 1 1:00 p.m. M  
2 II T
- Nurs. 10f,s. Introduction to Nutrition. A course dealing with food and its relation to the human body; the processes by which the body utilizes food; the study and classification of the various foods together with the caloric index. The normal diet and routine hospital diets are given with directions for modification under special circumstances. (1 cred.; 11 hrs.)  
10f Secs. A, B VII F  
C, D, E VIII F  
10s III T

\* An additional section of 51A will be added in the fall quarter and an additional section of 51B will be offered in the winter quarter as a continuation of 51A, if registration warrants.

‡‡ A fee of \$1 per credit is charged for this course.

Nurs. 11w,su. Foods and Nutrition. Laboratory and lecture course in practical dietetics, food preparation together with methods of cookery; definite instruction in carrying out the dietary prescription is given. (3 cred.; 44 hrs.)

Lect. M 12:00-1:00 p.m.

Lab. Hours arranged during experience

Nurs. 12s. Introduction to Nursing. An elementary course designed to prepare students for the clinical period. (3 cred.; 55 hrs. ar. May not be offered in 1942)

Nurs. 14w,su. Introduction to Medical Sciences. This course attempts to integrate the information which the student has learned in the physical and social sciences and focus it upon the patient in his relation to nurse, doctor, and community. It includes consideration of the development of medical science, the causes of disease, how disease manifests itself in the body, how the doctor makes the diagnosis, how disease is treated, and methods of disease control and prevention. (2 cred.; 22 hrs.)

14w Sec. 1 3:00-5:00 p.m. W

2 3:00-5:00 p.m. M

14su Secs. 1, 2 VIII-IX M

Nurs. 15w,su-16f,s. Nursing Arts.\* A course presenting the principles of fine nursing, demonstrating their application in the care of the patient, showing the relation between the operation of these principles and foundation sciences, developing through supervised practice a high degree of skill in caring for patients and judgment in observing symptoms and conditions. Nursing 15 includes ethics and covers a total of 88 hours. Nursing 16 includes bandaging, massage, and metrology and covers a total of 44 hours. (10 cred.; 140 hrs.; hrs. and days ar. during experience)

Nurs. 18w,su-19f,s. Principles of Medical and Surgical Nursing. A course designed to give a knowledge of the causes, symptoms, treatment, and prevention of abnormal medical and surgical conditions including the nursing and nutrition aspects and nursing care of patients with these conditions. Nursing 18 includes general consideration of causes and treatment of disease, conditions of the respiratory tract, including nose and throat, and conditions of the gastrointestinal tract, including oral hygiene, and conditions of the liver and gallbladder. Nursing 19 is devoted to study of the endocrine glands, of allergy, of the circulatory system, and of the urinary system. (8 cred.; 88 hrs.)

18w,su 1:00 p.m. MW

1:00-3:00 p.m. F

19f,s 1:00-3:00 p.m. M

1:00 p.m. WF

Nurs. 20f. Principles of Nursing in Conditions of the Skin. Lectures, classes, demonstrations, and clinics present the etiology, symptomatology, treatment, and nursing care of disorders of skin and closely related tissues. Emphasis is placed upon prevention of skin disorders and upon the mental hygiene, social, and economic aspects of treatment. (1 cred.; 11 hrs.; 3:00 p.m. W)

\* These courses may be reorganized for spring class in 1942 to co-ordinate with Nursing 12.

- Nurs. 23w,su. Massage. Demonstrations and class practice in the general manipulation of the body tissues and in those general movements which have the value of passive exercise for the sick or convalescent. For post-graduates. (1 cred.; 11 hrs.; hrs. and days arranged during experience)
- Nurs. 25f,s. Principles of Orthopedics and of Orthopedic Nursing. Lectures, classes, and clinics dealing with orthopedic conditions including fractures and amputations. Emphasis is laid upon the preventive, economic, and social aspects of these conditions. Treatment (including physical therapy) and nursing care are stressed. (2 cred.; 22 hrs.; 2:00 p.m. WF)
- Nurs. 35f,w,s,su. Principles of Communicable Disease Nursing. Lectures, classes, and demonstrations on the etiology, symptoms, treatment, and nursing care of communicable diseases with emphasis on their significance to public health and on preventive measures. (2 cred.; 22 hrs.; hrs. and days ar. during experience)
- Nurs. 36f,w,s,su. Principles of Tuberculosis and Tuberculosis Nursing. A course designed to give the distribution of tuberculosis, theories of invasion, pathology and bacteriology of tuberculosis, principles of treatment and care of tuberculous patients with emphasis on the preventive work in this field. Lectures, clinics, classes, and demonstrations. (2 cred.; 22 hrs.; hrs. and days ar. during experience)
- Nurs. 39f,s. Principles of Nursing in Conditions of the Reproductive System. This course consists of lectures on etiology, symptoms, treatment, and prevention of abnormal conditions. Psychological aspects of this branch of nursing are considered. Demonstrations, classes, and clinics form a part of the course. (1 cred.; 11 hrs.; 4:00 p.m. T)
- Nurs. 41f,w,s,su. Principles of Pediatrics and Pediatric Nursing. Lectures, classes, clinics, and demonstrations on the development, mental and physical, of the normal child, on the diseases of infancy and childhood, on treatment, care, feeding, and guidance of the child. Movements for the promotion of child health. (3 cred.; 33 hrs.)
- Sec. 1 3:30-4:30 p.m. M  
3:00 p.m. WF  
2 3:00 p.m. MWF
- Nurs. 43f,s. Principles of Obstetrics and Obstetric Nursing. This course gives instruction in the physiology, pathology, and hygiene of pregnancy, labor, puerperium, and care of newborn infants. Emphasis is placed on the relation of this field to the public health. Lectures, classes, clinics, and demonstrations. (2 cred.; 22 hrs.; 3:00 p.m. TTh)
- Nurs. 45w,su. First Aid. American Red Cross standard course. (1 cred.; 22 hrs.)
- 45w Sec. 1 1:00-3:00 p.m. M  
2 2:00-4:00 p.m. T  
45su Sec. 1 VI-VII MW  
2 VI-VIII TTh
- Nurs. 48w. Principles of Care in Ear Conditions. This course consists of lectures, classes, clinics, and demonstrations. It deals with medical and nursing care, and pathological conditions of the ear and nose. (1 cred.; 11 hrs.; hrs. and days ar.)



- Nurs. 49f,w,s,su. Principles of Care in Eye Conditions. (1 cred.; 11 hrs.; hrs. and days ar.)
- Nurs. 50s. Survey of Professional Fields. A course dealing with present-day problems of nursing—legal, economic, civic, legislative. A survey of fields of nursing and of related health movements. (2 cred.; 22 hrs.; hrs. and days ar. during experience)
- Nurs. 51f. Advanced Obstetric Nursing. Lectures, classes, clinics, and demonstrations on the hygiene, physiology, and pathology of pregnancy, labor, the puerperium and the newborn infant, recent research findings and new literature in the field of maternity and newborn care. For postgraduates. (2 cred.; 22 hrs.; hrs. and days ar. during experience)
- Nurs. 52f. Advanced Surgical Nursing. Lectures, classes, and demonstrations dealing with the more important surgical conditions, recent research, new literature, and treatments used in modern practice of general surgery. For postgraduates. (1 cred.; 11 hrs.; hrs. and days ar. during experience)
- Nurs. 53f,w,s,su.‡ Field Practice in Public Health Nursing. Six weeks. (Required for five-year students. May be available for some three-year students; hrs. and days ar. during experience)
- Nurs. 55f,w,s,su. Operative Aseptic Technique. A course dealing with the personnel of the operating room; the care and use of equipment; anti-septics and methods of sterilization; problems of co-ordination with other hospital departments; and management of operating room schedule. Taught by lectures, demonstration, discussion, and field types. For postgraduates. (1 cred.; 11 hrs.; hrs. and days ar. during experience)
- Nurs. 56f,w,s,su. Operating Room Administration. A course dealing with the administration and management of an operating room. Taught by lectures, discussion, and field trips. For postgraduates. (2 cred.; 22 hrs.; hrs. and days ar. during experience)
- Nurs. 60s,su. Ward Organization for Instructional Purposes. A course designed to acquaint the nurse with the principles underlying ward organization and personnel management for instructional purposes. Special consideration is given to the problems relating to the planning of schedules, patient care, programs, and analysis and evaluation of clinical materials for ward teaching programs. Opportunity for application of these principles in a real ward situation carrying two additional credits will be required of all postgraduate students except those in the operating room and will be elective for any other students in the course by special permission of the instructor. (4 cred.; 44 hrs.)  
 60s VI-VII TTh  
 60su I-II MTWTh
- Nurs. 63f. Motion Study. A course designed to apply the science of motion study to the technique of nursing. The student is taught to analyze critically the present methods used in nursing, and to devise better ways of doing the job. Motion picture method of analysis, lectures, and laboratory work. (2 cred.; 33 hrs.; VI,VII,VIII Th.)

‡ A fee of \$3 per quarter is charged for this course.

Nurs. 65w. Comparative Nursing Procedures. A comparative study of nursing procedures including individual projects. (4 cred.; 44 hrs.; VI-VII TTh.)

Nurs. 69f. Survey of Conditions and Trends in Nursing. A study of conditions existing in nursing as revealed in literature and reports. (3 cred.; 33 hrs.; IV MWF.)

Nurs. 71s. Curriculum Making in Schools of Nursing. General principles of curriculum making; study of the functions of the graduate nurse in the community as determinants of the clinical and classroom curricula of the professional school. Integration of materials into curricula preparing nurses as community health agents. (3 cred.; 33 hrs.; VI MWF.)

Nurs. 72w,su. Teaching and Supervision in Schools of Nursing. Principles of teaching applicable in schools of nursing. Planning of class work. Use of case studies, ward clinics and demonstrations, and assignment of practice, as methods of clinical teaching. Methods of evaluating students' work. Principles of supervision and their application for the improvement of nursing practice. For postgraduates. (3 cred.; 33 hrs.)

72w VIII TTh, IX Th

72su III MTWThF

IV MTWF

Pharm. 8w,su. Elementary Pharmacology. A study of the history, uses, classification, and preparation of drugs; definition of descriptive terms; methods of administration; principles of dosage, etc., together with appropriate laboratory exercises. (3 cred.; 44 hrs.)

8w Secs. 1, 2 2:00 p.m. MW

Sec. 1 3:00-5:00 p.m. M

2 3:00-5:00 p.m. W

8su Secs. 1, 2 2:00 p.m. MW

1, 2 3:00-5:00 p.m. W

Physiol. 1f,s. Elements of Physiological Chemistry. (a) A brief study of physical and chemical laws; of the composition of matter, chemical compounds, chemical and energy changes; of the ionic theory; of gases and solutions. (b) The physiological chemistry of gases, water, salts, carbohydrates, fats, and proteins; of the nutritive media, of digestive fluids and digestion, of metabolism, of excretion and excretory products. (3 cred.; 44 hrs.)

1f Lect. and quiz. II ThS, III Th

A, B VII, VIII M

Lab. Secs. C, D, E I, II T

1s Lect. and quiz. II MWF

Lab. II, III S

Physiol. 2f,s. Elements of Physiology. Functional properties of tissue cells; the material bases of the body; the nutritive media; the physiology of nerve and muscle, of the nervous system; the vascular mechanism; respiration, digestion, excretion, and metabolism. (5 cred.; 66 hrs.)

2f Lect. and quiz. I ThS, VI F

Lab. Secs. A, B III, IV S

C, D, III, IV T

E, VII, VIII F

2s Lect. and quiz. I TThS

Lab. II, III Th

- Physiol. 4f,s. Human Physiology. (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.; III,IV MWF; 301 MH)
- Physiol. 50f. Physiological Chemistry. (4 cred.; primarily for phys. ed. students†; jr., sr.; prereq. inorganic chemistry; VI MTWThF; ar.)
- Physiol. 51w. Human Physiology. (6 cred.; primarily for phys. ed. students†; jr., sr.; prereq. Zool. 1-2-3; Inorg. Chem. 1-2-3, or 4-5, or equiv.; Physiol. 50; Human Anatomy or Comp. Anatomy; IV MWF, VI,VII,VIII,IX T, VI,VII,VIII Th; MH)
- P.M.&P.H. 3f,w,s. Personal Health. Elementary principles of normal body function; predisposing and actual causes of disease; ways in which disease may be avoided. (2 cred.; 22 hrs.)  
 3f VI MW  
 3w VI WF  
 3s VI MW
- P.M.&P.H. 56s. Introduction to Public Health Nursing. The nurse's place in the general public health program; community organization for health and the relationship of public health and other welfare agencies; preparation required for entering the public health nursing field and the opportunities it presents. (1 cred.; 11 hrs.; hrs. and days ar. during experience)

### CLINICAL EXPERIENCE\*§¶

#### COMMUNICABLE DISEASE NURSING

Experience in nursing care of communicable diseases, venereal diseases, and tuberculosis. Preventive and public health aspects are emphasized. Observation of venereal treatment in out-patient department is arranged wherever possible. 6 weeks.

#### GYNECOLOGICAL NURSING

Nursing care of gynecological patients. Examination, pre- and post-operative care, including surgical dressing room technique. 4 weeks.

#### MEDICAL NURSING

Clinical experience in the application of principles of medical nursing to the care of medical patients. The care of patients with neurological disorders is included in this period. 17 to 26 weeks.

#### NURSERY SCHOOL

Experience in observing, and assisting with, the care of the normal child. 4 weeks.

\* Three-year students who (because of overcrowding in the public health nursing agencies) cannot be accepted for field practice, receive in lieu thereof one month's experience in the nursery school plus two additional weeks in the out-patient department.

† Others may be admitted by special permission.

§ Suitable substitutes for students not receiving full assignment to tuberculosis experience are approved by the faculty.

¶ A slight variation of clinical experience is allowed for illness, absence, and vacation adjustments.

## OBSTETRIC NURSING

Clinical experience in the care of obstetric patients, both mothers and newborn infants, including the instruction of mothers. Practice in assisting at both normal and abnormal deliveries. One week is spent in related clinics in out-patient department. 12 weeks.

## OPERATING ROOM

The students learn and apply in practice the principles of sterile technique and the care of operating room equipment and supplies. They give assistance at a number of operations of varied types including general surgical, orthopedic, ear, eye, nose, and throat, gynecological and urological, as well as assistance with cystoscopic treatments. 8 weeks.

## OUT-PATIENT DEPARTMENT

Experience in the management of clinics, assisting with examination and treatment of patients. A study of the dispensary as a community health center. 4 weeks.

## PEDIATRIC NURSING

Observation of the normal child, preparation of formulae, clinical experience in the care of convalescent and sick infants and children. One week is spent in related clinics in out-patient department. 12 weeks.

## PRIVATE PATIENT NURSING

A period of clinical experience in the nursing care of private patients, usually in the medical and surgical services. 6 to 12 weeks.

## PSYCHIATRIC NURSING

A clinical experience with a wide variety of psychiatric disorders. Supervised practice in care of the underactive, the overactive, the newly admitted, and the convalescent patient, in planning and supervising occupational and recreational therapy, and in giving simple hydrotherapy. 6 weeks.

## PUBLIC HEALTH NURSING

Supervised field experience with community public health nursing agencies. 6 weeks.

## SPECIAL DIET KITCHEN

Supervised practice in preparing, planning, and calculating therapeutic diets. Two classes a week are held, covering diet therapy for the patient under treatment at the time. 4 weeks. Students also have 2 weeks of pediatric diet preparation while in the Pediatric Department.

## SURGICAL NURSING

Application of principles of surgical nursing to the care of surgical patients including those affected by urological, orthopedic, and ear, eye, nose, and throat conditions. 17 to 26 weeks.

## TUBERCULOSIS NURSING

Clinical experience in nursing care of all types of tuberculosis. Preventive and educational aspects are emphasized. 4 weeks.

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*The Bulletin of the*  
UNIVERSITY of MINNESOTA

West Central School and Station  
· Morris, Minnesota  
Announcement for the Year 1941-1942

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Volume XLIV, Number 45

July 15, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

## SCHOOL CALENDAR

1941-42

1941

September	29	Monday	First term opens; registration new students
September	30	Tuesday	Registration of old students
October	1	Wednesday	Organization of classes
November	11	Tuesday	Armistice Day; a holiday
November	19	Wednesday	Parents' Day
November	20	Thursday	Thanksgiving Day; a holiday
December	19	Friday	First term closes

1942

January	5	Monday	Second term opens; registration
January	6	Tuesday	Organization of classes
February	12	Thursday	Lincoln's birthday; a holiday
March	6	Friday	Senior Class Play
March	14	Saturday	Achievement Banquet
March	20	Friday	Music Pupils' Recital
March	22	Sunday	Baccalaureate Services
March	25	Wednesday	Junior-Senior-Alumni Banquet
March	27	Friday	Commencement Exercises Second term closes

## FACULTY

Walter C. Coffey, M.S., LL.D., Acting President of the University  
Clyde H. Bailey, Ph.D., Acting Dean, and Director of the Department of Agriculture

### AT MORRIS

#### ADMINISTRATION

Theodore H. Fenske, M.S., Superintendent  
Edwin J. Volden, Registrar  
Hazel Winter, Secretary and Assistant Registrar  
Arlette M. Soderberg, B.A., Librarian  
Dorothy Zellers, B.S., Director of Home Economics  
Nanna Jelstrup, B.A., Dean of Women  
Amy Lundquist, R.N., School Nurse  
Gudrun Fredensberg, Accountant  
Henrietta Novy, Secretary

#### AGRICULTURAL ENGINEERING

Julius Felt, Carpentry, Farm Structures  
Albert C. Heine, Physics, Farm Mechanics, and Electricity  
Alex B. Rolfe, Forge, Welding, and Mechanics  
Albert Anderson, Forge  
Leland O. Hanson, B.S., Automotive Engineering

#### AGRONOMY AND HORTICULTURE

John A. Anderson, B.S.A., Botany and Horticulture  
Roy O. Bridgford, M.S., Farm Crops and Soils

#### ANIMAL HUSBANDRY

Allen W. Edson, B.S., Poultry  
Philip S. Jordan, B.S. in Agr., Animal and Dairy Husbandry  
Walter Hokanson, Herdsman

#### AGRICULTURAL ECONOMICS

Allen W. Edson, B.S., Farm Management and Marketing  
Glenn I. Prickett, B.A., Rural Sociology and Economics  
Clarence J. Hemming, M.S., Farm Accounts, Agriculture

#### HOME ECONOMICS

Eva Paulson, M.S., Applied Art and Foods  
Ethel Gustafson, B.S., Clothing  
Fern B. Johnson, B.S., Home Management and Child Training  
Dorothy Zellers, B.S., Foods and Home Furnishing  
Amy Lundquist, R.N., Nursing

#### ASSOCIATED SUBJECTS

Bernice E. Anderson, B.S., Typewriting and English  
Lucile Cox, B.A., Business Training  
Nanna Jelstrup, B.A., English and Mathematics  
Theodore S. Long, M.A., English and Public Speaking  
Margaret O'Connor, M.A., Music  
Alice Bayer, B.A., Music  
Arlette M. Soderberg, B.A., English and Physical Training  
Glenn I. Prickett, B.A., History, Home Project Supervisor  
Helen Swan, Piano  
Edwin J. Volden, Accounting



## GENERAL INFORMATION

### PURPOSE

The West Central School of Agriculture was organized in 1910 as a division of the Department of Agriculture of the University of Minnesota. It was established primarily for the training of young men and young women for the vocations of farming and homemaking. It is a secondary school accepting students directly from the eighth grade and offers extensive opportunities to that large group of young people who desire intensive vocational training and who are limited as to the time they can give to the completion of their education. The work is planned and the subjects are taught with the purpose of making the students efficient in their chosen vocations. The courses are sufficiently extended to give a fairly complete technical knowledge of the vocations of farming and homemaking, and a working basis for the economic and sociological aspects of farm life. The technical courses are amply supplemented by cultural subjects designed to give the students a broad and liberal outlook and the necessary preparation for useful citizenship.

### LOCATION

The school is admirably situated to serve that large section of the state in which it is located. A network of improved state highways connects the city of Morris with all parts of the district. The school itself adjoins the city of Morris and is situated on a natural rise of ground overlooking the Pomme de Terre Valley. The campus, with its thirty-one buildings, attractive lawns, and pleasant drives, is one of the beauty spots in this section.

### ADMISSION

The school will admit any young man or young woman of good moral character, who has completed the eighth grade and who desires technical training in agriculture and home economics. In special cases those who have not completed eighth grade work will be admitted. Mature young men and women who have been out of school for two or more years and desire special training in agriculture and home economics will be admitted. High school courses equivalent to courses offered in the School of Agriculture will receive the same credit as those offered in the school. High school graduates may register for any of the courses offered, and by properly planning their program, may become graduates of the School of Agriculture in much less time than the three years required for the regular student. Many high school graduates come for one year of specialized vocational training. Students should correspond with the registrar, before coming to the school, and make the necessary preliminary arrangements for registration.

### TIME OF OPENING

The fall term of the West Central School of Agriculture will open the last Monday in September and close the Friday before Christmas. The winter term will open the first Monday in January and close the last Friday in March. The school work covers a period of six months, at a time when the student can best be spared from home.

## THREE-YEAR COURSE

The regular courses cover a period of three sessions of six months each, from October through March. The course for young men is so arranged as to make it possible for the student to select a portion of the work in any of the following groups: agronomy, horticulture, animal husbandry, farm management, economics, or agricultural engineering. The course for young women provides special training in home management, clothing construction, foods, music, home nursing, public speaking, and business training. Both young men and young women may elect courses and receive credit in music in connection with any of the regular courses. They may also, in the third and fourth years, elect academic subjects, preparatory to college entrance. The main emphasis of the institution is given to the regular courses and all students are urged to complete the three-year course.

## ADVANCED COURSES

It has been found that many students desire an advanced year after completing the regular three-year course. To meet this demand a fourth session of six months of work is offered. During this advanced year, graduates of the three-year course may elect to specialize in one of the lines of work listed below. They may at the same time choose from the elective lists subjects that they could not obtain during their first three sessions. The major lines of work suggested for boys are dairying, livestock production, farm engineering, economics, and academic subjects. The major lines for girls are home training, nursing, music, business training, and academic subjects.

## COLLEGE PREPARATORY

Graduates of the three-year course at the West Central School of Agriculture who have completed two summers of supervised work on their home farms, one additional school year of six months, and one additional summer's work or the equivalent thereof, will be admitted to the University of Minnesota, and to the state teachers colleges.

## COURSES FOR HIGH SCHOOL GRADUATES

High school graduates who are interested in securing further training on a noncollege vocational basis, are at liberty to select from any of the many courses offered. Students may specialize in agriculture, mechanical training, business training, or home economics. For a list of courses especially suited to high school graduates see pages 17 and 18. Some students may desire to earn a School of Agriculture diploma. This can easily be done in two years of six months each. Such students must complete certain required work listed on pages 14 through 17. Those not interested in a diploma may attend for one or more years and choose courses which fit their needs.

## DEPARTMENT OF MUSIC

For students desiring special courses in music, credit courses in both vocal and instrumental music are offered. Prospective students should refer to the description of the music courses on pages 26-27.

## HOME PROJECT WORK

The purpose of this work is to promote and extend the technical work given in the classrooms and laboratories during the regular school sessions. The approved methods of home economics and agricultural practice are applied to some branch

of the home or farm enterprise which the project is intended to cover. Reports are required throughout the season and the work is, at all times, in charge of supervisors who make the necessary visits to each student.

A description of all projects is given on pages 28-31.

#### ROOMS IN DORMITORIES

Old or new students planning to attend the West Central School of Agriculture should write early to the registrar, asking him to reserve a room in one of the dormitories. Students should reserve rooms in advance. Each dormitory room is furnished with two single beds, mattresses and pillows, a dresser, table, and chairs. Preference as to roommates should be stated early, and will be considered as far as possible.

#### WHAT TO BRING

Each student should bring with him one comforter and two blankets, towels, comb, brushes, one tumbler, one teaspoon, bedroom slippers, and at least two night-gowns or pajama suits. Students will also bring four single-bed-size sheets, two pillow cases, and a bedspread for a single bed. Sheets and pillow cases should be plainly marked with student's name, marking to be done with nonwashable ink, or by embroidering the name.

Each girl should bring with her, in addition to the items mentioned above, a bathrobe or housecoat, an apron, and a laundry bag. The bathrobe or housecoat may be of any style and material, the laundry bag should be of washable material large enough to hold the soiled clothes of one person. The bedroom slippers should have soft soles; tennis shoes and gymnasium suits are also needed, but it is recommended that students acquire these after entering school.

#### TUITION FEES

The Minnesota legislature during the 1935 session amended the State School Aid Law, making it possible for eligible students to attend the schools of agriculture without the payment of tuition fees. The fees of such students are paid from State School Aid funds. These students will be required to pay only board and room.

All residents of Minnesota are eligible for tuition exemption who are eighth grade graduates and have not graduated from high school; who are under 21 years of age; and who do not reside in accredited high school districts.

*A student who is eligible for tuition exemption must secure a tuition certificate from the county superintendent of the county in which the student graduated from the eighth grade. This certificate must be presented at the time of registration.*

Students who do not qualify for tuition exemption are those who have not completed the eighth grade or who are high school graduates; who are 21 years of age or older; who reside in accredited high school districts; or who reside outside of the state of Minnesota.

Students not eligible for fee exemption will pay the following fixed fees as well as fees charged for various courses where laboratory material is used. The amount of these fees will be found in the description of the courses, pages 19-28.

Fees and first month's board and room are payable at the time of registration.

	Per term (3 months)
Registration .....	\$3.00
Gymnasium .....	1.00
Health Service .....	3.00
Book rent .....	1.50
Post office .....	.20
Privilege .....	2.50

Students who are not eligible for fee exemption may elect to pay \$18 per term to cover all the tuition, laboratory, and equipment fees (except deposit) rather than pay the individual fees listed above and the special fees charged for various courses.

#### BOARD AND ROOM

The cost of board will be \$14 per school month and for room \$5 per school month. No increases will be made unless living costs make the same necessary.

Chapter 523 of the 1941 Session Laws of the State of Minnesota provides funds to reimburse school districts for the transportation or board of nonresident high school pupils and students attending the state schools of agriculture, such transportation or board to be at rates, and under rules and regulations to be determined by the State Board of Education. See your county superintendent or local school board for further information about this.

Board and room are payable the first of each month in advance. No accounts can be carried. If students are compelled to be absent from school, the following regulations will govern refunds. No refunds are given for week-end absences. Room rent refunds are not made for any period of less than one month. Board refunds are made to the extent of one-half credit for the first two-week period and full credit for any additional time, provided the student notifies the dining hall manager before leaving. All students not residents of Morris are required to live in the dormitories and to board in the school dining hall, unless special arrangements are made with the superintendent. Such arrangements should be made prior to registration for classes.

On entering the school each student should bring sufficient money to pay for one month's board and room and to pay his fees, if required. This will amount to from \$24 to \$42.

#### BREAKAGE DEPOSIT

All students are required to make a breakage deposit of \$5 at the time of registration. Students who break laboratory equipment or damage school property are charged for necessary repairs or replacement and such charges are deducted from breakage deposits. Miscellaneous damage to dormitories and other school buildings, which cannot be charged to individual students, must be charged collectively to the breakage deposits of all students occupying the building. The unused balance of the breakage deposit is returned to the students about three weeks after the close of the second term. No refunds, either from breakage fees or credit account balances, are made to students who have an unpaid student loan. In such cases balances are credited toward payment of the loan.

#### HEALTH SERVICE

The health fee is used to maintain the Students' Health Service. A special health service building is maintained and a full-time nurse is engaged during the school year. The health fee also provides for daily calls at the Health Service Building by a doctor at a specified hour, and his services are available to all

students at that time. It does not provide for extra nurses or for physicians' calls in case of serious sickness, where such are necessary, nor does it provide for extra costs caused by epidemics. These must be paid for by the student receiving the service. The Health Service is not equipped to take care of serious illness and cannot accept responsibility for such cases.

#### REGISTRATION

No student will be allowed to register for less than 23 credit hours of work, except by special permission of the chairman of the Scholarship and Standards Committee.

All fees must be paid at the time of registration.

No student will be allowed to register after the second week of the term, except by special permission.

#### CANCELLATION OF REGISTRATION

Students may cancel out of a course without a penalty of failure during the first six weeks of the term. If a student cancels after the first six weeks and is below grade in a subject at the time of cancellation, his record in that subject will be entered as a failure. Subjects may be added only during the first week of the term.

All changes in registration must be made on the proper form which the student will obtain from the chairman of the Scholarship and Standards Committee or his designated representative. All changes in registration must be approved by the Scholarship and Standards Committee.

Where cancellation of registration is necessary before the close of the term, tuition fees will be refunded as follows:

Period of Attendance	Percentage of Deduction	Percentage of Refund
None .....	None	100
Two days to one week.....	10	90
One week to two weeks.....	20	80
Two weeks to three weeks.....	30	70
Three weeks to four weeks.....	40	60
Four weeks to five weeks.....	50	50
Five weeks to six weeks.....	60	40

No student who has been in attendance more than one half of the term shall receive any refund of tuition.

#### ABSENCES

Each student who has been absent from a class shall, upon a lapse of not more than two class periods after an absence, present a pass from his preceptor or preceptress. Students off the campus may secure a pass from the chairman of the Scholarship and Standards Committee. In case of sickness, where students are under the care of the nurse, passes will be obtained through her only. All work lost through absence from class must be made up.

Where no legitimate excuse can be given for a class absence, it shall be deemed an unexcused absence. An unexcused absence will automatically reduce the grade to an E for the month in the class where the absence occurred. Failure to submit a pass from the preceptor within the time limit shall be evidence of failure to receive an excused absence.

Permission to go home, necessitating absences from classes, must be applied for, and approved by the preceptor or preceptress, at least two days in advance of such anticipated absence. Students are expected to present with their application

a bona fide letter from the parents stating the reasons or need for such absence. In emergency, permission may be received from the superintendent who shall present the application and letter from the parent to the Scholarship and Standards Committee for approval. Failure to make the necessary arrangements shall be considered as evidence of an unexcused absence.

#### CLASSIFICATION

In order to be classified as a junior, a student must have not less than 42 credit hours of work.

In order to be classified as a senior, a student must have not less than 94 credit hours of work.

In order to be classified as an advanced student, a student must have not less than 160 credit hours of work.

In order to be classified as a special student, a student must be a high school graduate, or must have completed the advanced course.

#### SCHOLARSHIP STANDARDS

##### *Marking System*

Students are graded on a scale of A, B, C, D, and E. A is a high honor mark and E denotes failure. The mark "incomplete" is reserved for special cases and means that for reasons not within the control of the student, he has failed to meet a specific and important requirement of the course, but has, in other respects, done passing work. The incomplete must be removed the month after it has been received. Extension of time for the removal of incompletes may be granted in special cases. If the deficiency is not made up, the mark of E is automatically substituted for the incomplete. If, on account of poor work, a student drops a subject after the first six weeks of the term, he receives a mark of E in the subject.

##### *Honor Point System*

Honor points are determined on the basis of grades. For each hour credit of A quality, students receive 3 honor points; of B quality, 2 honor points; and of C quality, 1 honor point. Work of D quality commands no honor points. When a course in which a student receives a mark of E is repeated, only the second grade is considered in reckoning the honor points.

#### SCHOLARSHIP REQUIREMENTS

In order to obtain a diploma or certificate from the school, a student must have as many honor points and credit hours as are required for graduation. This means that an average scholarship of C is required.

#### PROBATION AND ELIMINATION

A student who has less honor points than he has credit hours is placed on probation. A student is removed from probation when his total honor points equal his credit hours. A student on probation is subject to dismissal from the school. He may, however, appeal for reinstatement to the Scholarship and Standards Committee.

#### ELIGIBILITY

The following rules will govern eligibility for all interscholastic contests. The Scholarship and Standards Committee must approve all eligible students.

A. The student must be enrolled in the school not less than one week before the contest.

- B. He shall be making passing grades in at least four subjects for which he is enrolled. These four subjects must total 20 credit hours.

#### REQUIREMENTS FOR GRADUATION

Completion of the prescribed course of study, including all required work and enough electives to make a total of 160 credit hours.

Attainment of 160 honor points.

All students who expect to graduate from the three-year course are required to complete two summers of home project work. A summer of home project work is defined as completing at least one three-credit project or two two-credit projects. All boys who expect to graduate from the three-year course at the West Central School will be required to complete one crops project and either a livestock or a farm accounts project. Girls who expect to graduate from the three-year course must complete two food projects, two clothing projects, and either a home management or a home furnishing project.

Special cases may arise which make impossible the carrying out of the outlined schedule, in which case the student may, with the approval of the home project supervisor, complete one summer of project work and substitute other projects or equivalent school credits for the project requirements. Such substitution must be petitioned for on blanks provided by the project supervisor and must be approved by the chairman of the Scholarship and Standards Committee.

Candidates for graduation from the advanced or four-year course must complete the required work of forty-five additional honor points. They must also complete an additional summer of home project work or substitute extra school credits if this is not possible.

Students who expect to qualify for college entrance and are unable to carry the full three summers of project work may complete one summer of project work and ten additional school credits in lieu of each summer of project work missed.

A satisfactory rating in attitude.

Payment of all accounts.

For students transferring from other schools, one full year of residence is required. Under no circumstances will any student be permitted to participate in the graduation exercises who has not completed, in full, all of the requirements for graduation.

#### HOME LIFE IN THE DORMITORIES

The dormitory life of the students while attending the West Central School of Agriculture is subject to supervision. Everything possible is done to promote a healthful, moral atmosphere.

The preceptors and preceptresses have charge of students in their dormitories, and the regulations enforced are for the good of all.

From 8:00 a.m. to 4:20 p.m. students are busy with their school work. From 4:20 to 6:00 p.m. is a recreation period during which students' time is at their own disposal. During study hours students are expected to be in their rooms and to be quiet so that all may study undisturbed. Students may leave the campus in the evening only upon permission of the preceptors or preceptresses. No firearms of any kind will be permitted in dormitories.

The use of tobacco in dormitory rooms is strictly forbidden. Infraction of dormitory rules may be sufficient cause for dismissal from school. Any student found using intoxicating liquor on the school premises will be subject to expulsion from school.

## DISCIPLINE

It is the aim of the administration to be firm, reasonable, and sympathetic. A student who becomes antagonistic to the spirit of the school will be dismissed whenever the general welfare requires. The school does not wish to undertake the problem of disciplining students who are not in sympathy with its purposes.

## BUILDINGS AND EQUIPMENT

The physical plant now includes thirteen modern brick and stone buildings which compose the educational group, and eighteen frame buildings which make up the farm group. The school group includes two girls' dormitories with facilities for 125 girls; three boys' dormitories with accommodations for 225 boys; Agricultural Hall, with stock judging pavilion, meat cutting, dairy, soils, chemistry, horticulture, botany, and farm crops laboratories, and classrooms for all agricultural and academic work; the Engineering Building with woodshop, forge shop, welding shop, farm mechanics laboratory, drafting room, and three lecture rooms; the Music Hall, with two studios and numerous practice rooms. The Business Training Department is also located in this building and includes typewriting, shorthand, business training, and penmanship rooms. The Dining Hall has two large dining rooms and modern kitchens. The Students' Hospital and Health Service Building is equipped with twenty-seven beds, a dispensary, and the nurses' quarters. The Home Economics Building has two foods laboratories, two sewing laboratories, laundering laboratory, home management room, classrooms, and departmental offices. The Administration Building houses the auditorium, the large library, and the administration, business, and registrar's offices. The Home Management Practice House will accommodate a group of ten people; and the Physical Education Building includes the gymnasium, swimming pool, locker rooms, and team training quarters.

The equipment in all shops and laboratories is ample and sufficient for the most practical and efficient instruction.

The eighteen farm buildings give ample housing facilities for the herds, flocks, and farm equipment which are available for student use.

## ASSEMBLY PERIOD

An assembly period is held three times each week throughout the school year. Students are required to attend these assembly exercises. It is the purpose of the school to secure prominent speakers to address the student body at these morning exercises. The assembly period is also used as a forum for public discussion of the many questions of the day and for announcements of importance to the student body.

## RELIGIOUS WELFARE

In maintaining the highest moral and religious atmosphere and in fostering the development of complete Christian manhood and womanhood—physical, intellectual, social, and spiritual—the student body and faculty have developed a close relationship with all of the churches in Morris. Students affiliate with the church of their preference and make it their church home while attending school. In addition to this affiliation, religious services are held each Sunday on the school campus. These exercises are under the joint direction of the Faculty-Student Religious Welfare Committee. The Young Women's Christian Association is represented on the campus by a strong and active organization.



## MUSICAL ORGANIZATIONS

The school musical organizations include a large chorus, a school orchestra, and a band. Students especially interested in music are urged to join one or more of these organizations and receive the training which they afford. The musical clubs appear at various school functions. A public concert recital is given at the close of the school year.

## THE MOCCASIN

The *Moccasin* is the annual class book published by the senior class of the school. It gives an outline of all school and class activities, is fully illustrated, and contains, in addition to brief articles of student interest, a record of the development and growth of the institution.

## WEST CENTRAL SCHOOL NEWS

The *West Central School News* is a quarterly published by the faculty of the school. It serves as a community publication, and is a medium by which former students and alumni are kept in touch with one another and with the school. It is also published to disseminate among its readers useful information and the results of station work.

## STUDENT LOAN FUNDS

Students attending the West Central School of Agriculture are afforded the opportunity of participating in the student loan funds available to students who attend the University of Minnesota. This money is loaned to worthy and deserving students at the West Central School in amounts not to exceed \$50 to any one person in one year, at the rate of 5 per cent per annum. Students interested in securing a student loan should correspond with the superintendent of the West Central School of Agriculture.

## THE WEST CENTRAL SCHOOL OF AGRICULTURE LOAN FUND

The classes of 1930 and 1931 have left a loan fund of \$450 to be loaned to needy and worthy students. This money is loaned in amounts not to exceed \$50 to any one person in one year at the rate of 5 per cent per annum.

## SEVENTH DISTRICT FEDERATION OF WOMEN'S CLUBS LOAN FUND

The Seventh District Federation of Women's Clubs presented the sum of \$1,000 to the West Central School of Agriculture in 1932 to be used as a loan fund to assist needy and worthy students to acquire an education at the West Central School. Students who benefit from this fund must reside in the Seventh District. This fund is loaned in amounts and under conditions that govern other student loan funds.

## CALEB DORR CASH SCHOLARSHIPS

By a decision made in April, 1922, by the Board of Regents of the University of Minnesota, a part of the income from a bequest made by the late Caleb Dorr, of Minneapolis, was made available to the schools of agriculture. At the West Central School this fund is awarded to worthy students for excellence in scholarship and for achievement in leadership. The scholarships awarded are used to help defray the students' expenses while they are in school.

## INTERSCHOLASTIC ACTIVITIES

Each year the school is represented by teams in debating, declamation, and stock and grain judging, which meet in interscholastic contests with students from similar institutions

In athletics the school is represented by both football and basketball teams. These teams schedule games with colleges and other agricultural schools.

#### LIBRARY

The library is well equipped to supply the needs of the students. A large number of books have been selected to meet the requirements of the various departments. These, with the government and station reports, are available for use by instructors and students.

The librarian is always ready to give assistance in directing students in the selection of books they may need in the pursuit of their work.

#### BOYS' AND GIRLS' CLUB WEEK

The annual Boys' and Girls' Club Week is held during June. This is a two-day course open to all boys and girls engaged in 4-H Club work. Boys are given special training in all of the boys' club projects. The girls are given work in home economics with special reference to the club projects. Games, music, and special entertainment will make the entire program of interest to all who attend. A special circular describing this short course is issued.

#### SHORT COURSE FOR FARM WOMEN

An annual short course for farm women is held during the month of June. The main object of this course is to provide a few days' rest, recreation, and instruction for the women of the farms in west central Minnesota. Talks, classes, and demonstrations along lines of interest to farm women will fill in part of the day. The large dormitory and dining hall will provide ample living accommodations, and part of each day will be given to rest and recreation. A special bulletin describing this course will be issued.

#### EXPERIMENT STATION

The West Central School and Station is now conducting extensive experiments in crops, soils, horticulture, and animal husbandry. Special reports and bulletins are published from time to time giving the results of experimental work.

#### SCHOOL FARM

The farm comprises approximately 800 acres and furnishes an extensive laboratory for the work of the school. Information concerning the methods employed on the farm is always available to the students. The classroom work is supplemented with actual practice, either in the field or with laboratory practice using the crops grown on the farm.

#### STATION FLOCKS AND HERDS

The school now maintains excellent livestock herds and flocks, all of which are used for student work in the Animal Husbandry Department. Purebred Holstein and Shorthorn cattle, Percheron horses, Shropshire sheep, Poland China hogs, and White Leghorn chickens are maintained for station and school purposes. These afford excellent opportunities for students to study intelligently the various courses in animal husbandry.

## COURSES OF STUDY

Figures following the names of courses indicate the number of credit hours. One credit hour is equivalent to one class period per week devoted to recitation or two such periods devoted to laboratory work.

A class period is forty minutes and a laboratory period is eighty-five minutes.

For description of the following courses see pages 19-28.

For description of home project work see pages 28-31.

High school courses equivalent to required courses will be substituted for them in the case of students who transfer from other schools.

### COURSES FOR BOYS

In addition to the required courses as outlined below, a boy who wishes to graduate from the three-year course must, during the time he is in school, elect three courses totaling at least 6 credit hours in each of the following: Agronomy and Soils, Animal and Poultry Husbandry, and Agricultural Engineering; and two courses in Agricultural Economics. He may choose these from the elective courses listed. During any one term, at least 23 required and elective credit hours must be carried.

#### FRESHMAN YEAR

First Term

Second Term

#### *Required*

English I A, 5  
 §Farm Arithmetic A, 3  
 Agricultural Science A, 2  
 †Freshman Lectures—no credit  
 †Types of Farming

English I B, 5  
 §Farm Arithmetic B, 3

Either Term

§Word Study and Penmanship, 3

#### *Electives*

\*Carpentry I A, 2  
 \*Forge I A, 2  
 \*Farm Mechanics I A, 2  
 Management of Laying Flock, 3  
 Elementary Beekeeping, 2

\*Carpentry I B, 2  
 \*Forge I B, 2  
 Farm Mechanics I B, 2  
 Incubation and Brooding, 3  
 Livestock Selection, 1  
 Agricultural Science B, 2  
 Crops and Soil Management  
 Elementary English

Either Term

\*Grain Crops, 5  
 Livestock Production, 4  
 Fruit and Vegetable Crops, 3  
 Automotive Engineering, 5  
 Chorus, 2  
 Freshman Vocal Study, 1  
 Group or Private Music, 1 or 2

\* Required as a prerequisite for later courses.

† Not required of transfer students.

§ May be removed as a requirement by special examination.

COURSES OF STUDY

15

JUNIOR YEAR

First Term

Second Term

English II A, 5  
Chemistry A, 3

*Required*

English II B, 5  
Chemistry B, 3

Either Term

Farm Accounts, 3

*Electives*

Grain Judging, 2  
\*Physics, 5  
Farm Mechanics II A, 3  
Plant Diseases, 3  
Stock Judging A, 1  
Elementary Beekeeping, 2  
Landscape Gardening, 2  
Argumentation, 2  
Pure Seed Production, 2

\*Feeds and Feeding, 5  
Soils, 4  
Farm Mechanics II B, 3  
\*Electricity, 4  
Stock Judging B, 1  
Fruit and Vegetable Crops, 3  
Forage Crops, 2  
Incubation and Brooding, 3  
Public Speaking, 2  
Electric Arc Welding 2

Either Term

\*Gas Welding, 2  
Typewriting, 2 or 5  
Conservation, 2  
Farm Painting, 1  
Group or Private Music, 1 or 2  
Chorus, 2  
Music Appreciation, 2

SENIOR YEAR

First Term

Second Term

English III A, 5  
United States History, 5

*Required*

English III B, 5  
Government, 5

*Electives*

\*Farm Management A, 3  
Livestock Management, 3  
Dairy Production, 3  
Pure Seed Production, 2  
Farm Structures A, 1  
Animal Breeding, 3  
\*Bookkeeping A, 5  
\*Elementary Algebra A, 5  
Farm Marketing, 2  
Farm Mechanics III, 4  
\*Commercial Law A, 5  
Farm Economics, 3  
Mechanical Drawing, 1  
Special Problems in Farm Crops, 2

Farm Management B, 3  
Animal Diseases, 2  
Rural Sociology, 3  
Farm Structures B, 1  
Advanced Electricity, 3  
Bookkeeping B, 5  
Elementary Algebra B, 5  
Farm Finance, 3  
Livestock Problems, 2  
Commercial Law B, 5  
First Aid, 2  
Advanced Poultry Production, 2  
Practical Mathematics, 3

Either Term

Conservation, 2  
Meats, 4  
Typewriting, 2 or 5  
Shorthand, 5  
Gas Welding, 2  
Electric Arc Welding, 2  
Advanced Stock Judging, 2  
Group or Private Music, 1 or 2  
Chorus, 2  
Music Appreciation, 2

\* Required as a prerequisite for later courses.

Two credits shall be allowed for participation in interscholastic debate. Members of interscholastic athletic teams will be excused from gymnasium classes. Not more than five special credits, including credits for debate and music, shall count toward graduation.

## COURSES FOR GIRLS

## FRESHMAN YEAR

First Term

English I A, 5  
 General Science A, 3  
 †Social Training A, 2  
 Home Accounts I A, 3  
 §Word Study I A, 2  
 Gymnasium, 1

\*Clothing I A, 3  
 \*Foods I A, 3  
 \*Drawing and Design I A, 2  
 \*Landscape Gardening, 2  
 Management of Laying Flock, 3

Second Term

*Required*

English I B, 5  
 General Science B, 5  
 Social Training B, 2  
 Home Accounts I B, 3  
 §Word Study I B, 2  
 Gymnasium, 1

*Electives*

\*Clothing I B, 3  
 \*Foods I B, 3  
 \*Drawing and Design I B, 2  
 Incubation and Brooding, 3

Either Term

Freshman Vocal Study, 1  
 Group or Private Music, 1 or 2

## JUNIOR YEAR

First Term

English II A, 5  
 Home Furnishing II A, 3  
 Gymnasium, 1

\*Foods II A, 3  
 \*Clothing II A, 3  
 \*Crafts A, 2  
 Wardrobe Planning, 2  
 \*Laundering, 2  
 \*Home Nursing II A, 3

Second Term

*Required*

English II B, 5  
 Home Furnishing II B, 3  
 Gymnasium, 1

*Electives*

\*Foods II B, 3  
 \*Clothing II B, 3  
 Crafts B, 2  
 \*Home Nursing II B, 3  
 Incubation and Brooding, 3  
 Fruit and Vegetable Crops, 3  
 Household Equipment II B, 2  
 \*Child Care and Training, 3

Either Term

Shorthand, 5  
 Group or Private Music, 1 or 2

## SENIOR YEAR

First Term

English III A, 5  
 Home Management A, 3  
 United States History, 5  
 Economics of Buying, 3  
 Clothing III A, 4  
 Home Nursing III A, 3  
 \*Art Appreciation A, 2

Second Term

*Required*

English III B, 5  
 Home Management B, 3  
 Government, 5  
 Clothing III B, 4  
 Home Nursing III B, 3

Either Term

Home Management House, 8  
 Foods III, 3

\* Required as a prerequisite for later courses.

† Not required of transfer students.

§ May be removed as a requirement by special examination.

*Electives*

First Term	Second Term
*Crafts A, 2	Crafts B, 2
*General History A, 5	General History B, 5
*Elementary Algebra A, 5	Incubation and Brooding, 3
*Bookkeeping A, 5	Elementary Algebra B, 5
*Commercial Law A, 5	Rural Sociology, 3
	Bookkeeping B, 5
	Commercial Law B, 5
	Art Appreciation B, 2
Either Term	
Typewriting, 2 or 5	
Dictation, 5	
Group or Private Music, 1 or 2	

Through their choice of electives, students may prepare themselves for one of several lines of work. At the time of registration, students will be advised how to select their work so that it will prepare them for the vocation in which they are interested. They may prepare for business positions, for teacher training work, for college entrance, or for nurse's training.

COURSES FOR BOYS AND GIRLS

ADVANCED YEAR AND COLLEGE PREPARATORY COURSES

First Term	Second Term
<i>Required</i>	
English IV A, 5	English IV B, 5
Elementary Algebra A, 5	Elementary Algebra B, 5
Plane Geometry A, 5	Plane Geometry B, 5
General History A, 5	General History B, 5
Botany, 5	

*Electives*

Any course not previously completed during the regular three-year program or any business training courses. Attainment of 45 honor points and 45 credits required to complete advanced year.

HIGH SCHOOL GRADUATES

Graduates of high schools are at liberty to select from all courses offered. Some of the courses offered may duplicate work already completed in high school. The following list of courses may be used as a guide for making up a program of study.

AGRICULTURE

Fall Term	Winter Term
Farm Economics	Farm Finance
Farm Management A	Farm Management B
Farm Accounts	Soils
Farm Marketing	Advanced Stock Judging
Plant Diseases	Feeds and Feeding
Pure Seed Production	Animal Diseases
Special Problems in Farm Crops	Animal Breeding
Grain Judging	Livestock Problems
Livestock Management	Beekeeping
Dairy Production	Fruits and Vegetables
Landscape Gardening	Incubation and Brooding
Management of Laying Flock	Advanced Poultry Production
Conservation of Natural Resources	

\* Required as a prerequisite for later courses.

*Electives*

## BUSINESS TRAINING COURSES

Fall Term	Winter Term
Bookkeeping A	Bookkeeping B
Advanced Bookkeeping A	Advanced Bookkeeping B
Business Spelling and Penmanship A	Business Spelling and Penmanship B
Typewriting A	Typewriting B
Advanced Typewriting A	Advanced Typewriting B
Business English A	Business English B
Shorthand A	Shorthand B
Beginners' Dictation A	Beginners' Dictation B
Dictation A	Dictation B
Secretarial Studies A	Secretarial Studies B
Commercial Law A	Commercial Law B
Business Machines	Business Machines

## HOME ECONOMICS

Fall Term	Winter Term
Foods II A	Foods II B
Home Management A	Foods III B
Home Management House	Home Management B
Laundering II A	Home Management House
Economics of Buying III A	Child Care and Training II B
Clothing II A	Household Equipment II B
Clothing III A	Clothing II B
Wardrobe Planning II A	Clothing III B
Home Furnishing II A	Home Furnishing II B
Crafts II A	Home Nursing II B
Home Nursing III A	Home Nursing III B
	Crafts II B

NOTE.—Students should have had some training in home economics in either junior or senior high school; otherwise it will be necessary to start with the beginning courses.

## MECHANICAL TRAINING

Fall Term	Winter Term
Farm Structures A	Farm Structures B
Forge I A	Forge I B
Farm Mechanics I A	Farm Mechanics I B
Farm Mechanics II A	Farm Mechanics II B
Farm Mechanics III	Automotive Engineering
Automotive Engineering	Advanced Electricity
Electricity	Arc Welding
Physics	Gas Welding
Arc Welding	
Gas Welding	

## DESCRIPTION OF COURSES

### AGRICULTURAL ECONOMICS

- Farm Economics. A study of fundamental economic principles including the economic organization for production, demand and supply, price and value, the economics of government, the nature of money and banking, international trade, and other current economic problems. Rec. 3 hrs.; 3 credits.
- Farm Finance. A study of the financial structure of agriculture, rural taxation, the relation of tariffs and the monetary system to the agricultural industry. The Farm Credit Administration is fully covered. Rec. 3 hrs.; 3 credits.
- Farm Accounts. A study of farm accounts. The student keeps a practical set of books on the year's work, from the taking of the inventory to closing the accounts at the end of the year. Rec. 3 hrs.; 3 credits.
- Farm Management A. A study of farm organization as related to types of farming, combinations of enterprises, crop rotation, soil management, field and farmstead arrangement, and the efficient use of labor and equipment. Rec. 3 hrs.; 3 credits.
- Farm Management B. An advanced course in farm organization. Farm budgeting will be given important consideration. Prerequisite: Farm Management A. Rec. 3 hrs.; 3 credits.
- Farm Marketing. A study of the present system of distributing farm products. Special study is made of co-operative laws and co-operative marketing organizations. Rec. 2 hrs.; 2 credits.
- Types of Farming. Different types of agriculture in the state and nation are studied. Designed to point out to the beginning student the diversity of the agricultural occupation and the opportunities in the different fields. Rec. 2 hrs.; 2 credits.

### AGRICULTURAL ENGINEERING

- Carpentry I A. Carpentry; care, use, and sharpening of tools; laying-off work; making of joints and framing, and work designed to be especially helpful in planning, framing, and construction of farm buildings. Lab. 2, 2 hrs.; 2 credits; fee \$1.
- Carpentry I B. Continuation of Carpentry I A, with emphasis placed on completion of some project selected by the student. Prerequisite: Carpentry I A. Lab. 2, 2 hrs.; 2 credits; fee \$1.
- Farm Structures A. Design, location, and erection of farm buildings. A study is made of roofs, pitches, trusses, etc. Exercises in building, framing, window and door frame construction. Part of the time is devoted to mechanical drawing and plan reading. Lab. 1, 2 hrs.; 1 credit.
- Farm Structures B. A continuation of Farm Structures A. The student draws plans and makes up the material list for a farm building. Prerequisite: Farm Structures A. Lab. 1, 2 hrs.; 1 credit.
- Farm Painting. A study of paints and their uses. Simple exercises in painting, actual practice on buildings and farm equipment. Lab. 2 hrs.; 1 credit.
- Forge I A. Blacksmithing. Forging and welding of mild steel. Specific instruction in making and maintaining reducing fire and in the basic forge operations of drawing, bending, punching, upsetting, and welding. Lab. 4 hrs.; 2 credits; fee \$1.



- Forge I B. Continuation of Forge I A. Lab. 2, 2 hrs.; 2 credits; fee \$1.
- Farm Mechanics I A. A course designed to be of help in repairing general farm machinery and equipment. Work is offered in soldering, rope splicing, knots, belt lacing, use of taps and dies, tool sharpening and adjustment, harness repair work, etc. Lab. 2, 2 hrs.; 2 credits; fee \$1.
- Farm Mechanics I B. A continuation of Farm Mechanics I A. Emphasis is placed on some definite repair project which involves use of shop tools and equipment. Prerequisite: Farm Mechanics I A. Lab. 2, 2 hrs.; 2 credits; fee \$1.
- Farm Mechanics II A. Use of farm level—simple exercises in "running levels," chaining and measuring land. Exercises in map reading, making of farm plats from measurements taken in the field. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.
- Farm Mechanics II B. A study is made of all types of farm machinery, their adjustment and care. Materials used in the construction of farm machinery are covered. Selection of machinery for the field. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.
- Farm Mechanics III. The first six weeks are given to a study of the uses of concrete about the farm, grading and proportioning of sand and gravel, water cement ratios, mixing and placing of concrete, use of reinforcing in concrete, and the estimating of materials, etc. The last six weeks are devoted to a study of modern lighting, heating, ventilating, plumbing, and sewage disposal systems for the farmstead, their cost of installation, care, and maintenance. Prerequisites: Physics and Electricity I. Rec. 3; lab. 1, 2 hrs.; 4 credits.
- Automotive Engineering. A study of internal combustion engines with emphasis placed on tractor, truck, and automobile motors. A careful study is made of carburetors, ignition, lubrication, and cooling systems; also differentials and transmissions. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.
- Electricity. Kinds of electrification, magnetism, electromagnetism, magnetic induction, chemical generators, dynamos, motors, etc. Rural electrification, wiring of farm buildings, maintenance of electrical appliances in the home. Prerequisite: Physics. Rec. 3 hrs.; lab. 1, 2 hrs.; 4 credits.
- Advanced Electricity. A continuation of Electricity. The student is required to make power calculations, in both D.C. and A.C. circuits. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.
- Mechanical Drawing. Principles of drafting, lines, lettering, views of objects, making of working drawings, interpretation of drawings. Lab. 2 hrs.; 1 credit.
- Gas Welding. A careful study is made of the apparatus, of safety measures, of action of the various metals under the torch, and uses of flux. Student begins by running simple beads, gradually working into actual repair projects on welding, brazing, and cutting with the torch. Prerequisites: Forge I A and B. Rec. 1 hr.; lab. 1, 2 hrs.; 2 credits; fee \$3.
- Arc Welding. The course covers practice in making flat, horizontal, vertical up and down and overhead welds with bare and coated electrodes. Practice is given on both D.C. and A.C. welding machines. Prerequisite: Gas Welding. Rec. 1 hr.; lab. 2 hrs.; 2 credits; fee \$6.

### AGRONOMY AND SOILS

- Grain Crops. A study of corn and the principal cereal crops with emphasis placed upon the types and varieties most desirable, soil and cultural requirements, seed selection and preparation, cost of production, harvesting, and methods of improvement. Rec. 5 hrs.; 5 credits.

- Grain Judging. Score card practice, commercial grading and judging work, with the object in view of making the student proficient in the selection and growing of purebred seed. Prerequisite: Grain Crops. Lab. 2, 2 hrs.; 2 credits.
- Forage Crops. A study of the leguminous crops, clover, alfalfa, etc., pastures and meadows, and the annual forage crops. Cultural requirements of forage crops and their importance to the farm. Lab. 2, 2 hrs.; 2 credits.
- Pure Seed Production. Grow, harvest, clean, test, and secure certification from the Minnesota Crop Improvement Association of any of the recommended varieties of grains or corn. Prerequisite: Grain Crops. Lab. 2, 2 hrs.; 2 credits.
- Plant Diseases. A study of the most important diseases affecting farm crops, with the recommended methods for control. Rec. 3 hrs.; 3 credits.
- Soils. This course is applied to the needs of western Minnesota. Soil formation, soil types, soil physics, soil chemistry, soil tillage, and the use of fertilizers are given attention. Prerequisite: Chemistry A. Rec. 3 hrs.; lab. 1, 2 hrs.; 4 credits.
- Special Problems in Farm Crops. A course for seniors and advanced students. Takes up problems of a practical nature in farm crops and farm management and covers them more fully than do the elementary courses. Prerequisites: Grain Crops and Forage Crops, or their equivalent. Rec. 2 hrs.; 2 credits.
- Crops and Soil Management. A course for special students who intend to spend only three months' time in school. Includes a comprehensive study of the practical phases of corn and grain growing, soil management, and forage crops. Rec. 3 hrs.; 3 credits.

## ANIMAL AND DAIRY HUSBANDRY

- Livestock Production. An introduction to the livestock industry. The place of livestock on the farm is discussed, the types and breeds best adapted to the needs of different kinds of farms are studied. Principles of care and management outlined. Practice in selection and judging. Rec. 4 hrs.; 4 credits.
- Livestock Selection. Study and practice in the use of score cards, showing the relation of the body structure to economical production, covering all classes of livestock. Lab. 1, 2 hrs.; 1 credit.
- Stock Judging A. Comparative judging of beef cattle, swine, and sheep. Lab. 1, 2 hrs.; 1 credit.
- Stock Judging B. An advanced course in comparative judging of dairy cattle and horses. Lab. 1, 2 hrs.; 1 credit.
- Advanced Stock Judging. Open to those trying out for the interscholastic stock judging team. Lab. arranged; 2 credits.
- Feeds and Feeding. Principles of animal nutrition, composition and nutritive value of feeds, feeding standards, methods of feeding. Prerequisite: Chemistry A. Rec. 5 hrs.; 5 credits.
- Livestock Management. Production of beef cattle, sheep, swine, and horses, both purebred and market stock, including, from a practical standpoint, feeding and management of the herd or flock, selection of breeding stock, and arrangement of buildings and yards. Rec. 3 hrs.; 3 credits.
- Dairy Production. This course is designed to fit the student for the successful management of a dairy herd. The course prepares students for positions as testers in dairy herd improvement associations. Prerequisite: Feeds and Feeding. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.

- Animal Diseases. Cause and prevention of the more common diseases of farm animals, including emergency treatment. Rec. 2 hrs.; 2 credits.
- Animal Breeding. Theory and practice of animal breeding as it affects the economic value of our livestock. Rec. 3 hrs.; 3 credits.
- Meats. Practice in killing, cutting, and curing of meats for home consumption on the farm. Course is limited to seniors. Lab. 8 hrs.; 4 credits.
- Livestock Problems. A seminar and reading course in which the student selects problems of special interest to him. Open only to seniors and advanced students with at least 10 credit hours in animal husbandry. Rec. 2 hrs.; 2 credits.

### BEE CULTURE

- Elementary Beekeeping. Fundamentals of bee behavior throughout the cycle of the year. Fundamentals of beekeeping practice throughout the year. Modern equipment for beekeeping practice. Starting with bees, increase, moving, uniting, feeding. Rec. 2 hrs.; 2 credits.

### BUSINESS

- Business Spelling and Penmanship A. An advanced course in spelling and penmanship for students taking the business course. Rec. 3 hrs.; 3 credits.
- Business Spelling and Penmanship B. Continuation of Business Spelling and Penmanship A. Rec. 3 hrs.; 3 credits.
- Typewriting A. Individual instruction in the manipulation of all parts of the machine. The keyboard is learned by the touch method. Practical lessons are used. Drill 5 hrs., lab. 5 hrs.; 5 credits; fee \$1.50.
- Typewriting B. A continuation of Typewriting A. 2 or 5 credits; fee \$1.50.
- Advanced Typewriting A. For those who have had previous typing experience and can meet the set standards. Accuracy and speed are stressed. 2 or 5 credits; fee \$1.50.
- Advanced Typewriting B. A continuation of Advanced Typewriting A. 2 or 5 credits; fee \$1.50.
- Shorthand A. The Gregg System taught according to the functional method and supplemented with speed studies is used. Rec. 5 hrs.; 5 credits.
- Shorthand B. Continuation of Shorthand A. Rec. 5 hrs.; 5 credits.
- Beginners' Dictation A. Dictation and transcription drill for those students taking Shorthand A. Rec. 5 hrs.; 5 credits.
- Beginners' Dictation B. Continuation of dictation and transcription drill for those students taking Shorthand B. Rec. 5 hrs.; 5 credits.
- Dictation A. For those who have had previous training in shorthand. A continuation of Shorthand A, stressing speed, accuracy, and machine transcription. Rec. 5 hrs.; 5 credits.
- Dictation B. Continuation of Dictation A. 5 hrs.; 5 credits.
- Business English A. A thoro study of grammar and effective English usage in relation to business. Rec. 5 hrs.; 5 credits.
- Business English B. Continuation of Business English A, dealing with the writing of business letters and other forms. Rec. 5 hrs.; 5 credits.
- Secretarial Studies A. Course includes training in office routine, such as filing, indexing, and stenciling. Individual instruction in dictaphone. Rec. 5 hrs.; 5 credits.
- Secretarial Studies B. Continuation of Secretarial Studies A. Rec. 5 hrs.; 5 credits.

- Bookkeeping A. Preparation and interpretation of balance sheets; purpose of accounts and principles of account classification; profit and loss statements. Rec. 5 hrs.; 5 credits.
- Bookkeeping B. Source of ledger entries; cash receipts and disbursements; general journal; purchase and sales records; practice set. Rec. 5 hrs.; 5 credits.
- Advanced Bookkeeping A. Controlling accounts; records of original entry; business practice and procedure; depreciation and bad debts; accruals and deferred items; adjusting and closing entries; partnerships, departmental revenue accounts; practice set. Rec. 5 hrs.; 5 credits.
- Advanced Bookkeeping B. Nature and characteristics of the corporation; proprietorship in the corporation; formation and operation of a corporation; corporation accounts; fixed and intangible assets; manufacturing; analysis of financial statements; use of statistical data in business management; graphical method of presenting accounting facts. Rec. 5 hrs.; 5 credits.
- Commercial Law A. A thoro study is made of contracts, sales, agency, and negotiable instruments. Rec. 5 hrs.; 5 credits.
- Commercial Law B. Continuation of Commercial Law A and further study includes guaranty, bailment, insurance, real property, fixtures, partnership, corporations, and bankruptcy. Rec. 5 hrs.; 5 credits.
- Business Machines. Operation of the more common machines found in offices. Includes practice on adding machines, listing machines, calculators, and duplicating devices. Rec. 1 hr.; lab. 4 hrs.; 3 credits.

## ENGLISH AND PUBLIC SPEAKING

- English I A. Functional grammar, capitalization, punctuation, word study, and library instruction. Oral composition, discussions, reports, and simple debates. Extensive reading with memory work from various types of literature of representative English and American authors. Rec. 5 hrs.; 5 credits.
- English I B. Continuation of English I A. Written composition with special emphasis on letter writing and story telling. Rec. 5 hrs.; 5 credits.
- English II A. Review of functional grammar, advanced work based on variety in sentence structure and the paragraph. Extensive reading with memory work from various types of literature of representative English and American authors. Rec. 5 hrs.; 5 credits.
- English II B. Continuation of English II A. Library instruction, gathering information, organization, oral reports, and letter writing. Rec. 5 hrs.; 5 credits.
- English III A. Remedial work in grammar, punctuation, and the mechanics of English with special emphasis on the clause and phrase for variety and clearness. Understanding of American life and ideals of the past and the present by the study of great American writers and their works. Rec. 5 hrs.; 5 credits.
- English III B. Continuation of English III A. Gathering material from books and periodicals, compiling a bibliography, with special emphasis on the logical outline in exposition and argument. Stress on public speaking, and formal and informal debate. Rec. 5 hrs.; 5 credits.
- English IV A. Advanced work in grammar, good usage, variety in diction, and punctuation. Creative writing and library research. Extensive reading from English literature to modern times with major emphasis upon the selections themselves and minor attention to historical backgrounds and biography of writers. Rec. 5 hrs.; 5 credits.
- English IV B. Continuation of English IV A. Rec. 5 hrs.; 5 credits.

- Elementary English. A course for older boys and men who attend school during the winter term. Reading, spelling, and a brief review of the principles of grammar is given. Rec. 3 hrs.; 3 credits.
- Argumentation. Principles of debate are studied, gathering of evidence and outlining arguments stressed. Practice in speaking. Rec. 2 hrs.; 2 credits.
- Public Speaking. A study of the facts and principles common to all speaking, together with platform projects. Rec. 2 hrs.; 2 credits.
- Word Study and Penmanship. Drill in spelling and usage of common words, and penmanship. Rec. 3 hrs.; 3 credits.
- Word Study I A. (Girls.) A study of the spelling, meaning, use, and pronunciation of words designed to increase and improve the student's written and oral work. Rec. 2 hrs.; 2 credits.
- Word Study I B. A continuation of Word Study I A. Rec. 2 hrs.; 2 credits.

### HOME ECONOMICS

To defray costs of laboratory supplies used in the various courses, a fee of \$2 per term is charged all students registering in home economics courses.

#### FOODS AND HOME MANAGEMENT

- Foods I A. This course is divided into five parts. It gives the basic principles and standards for each of the following: canning, food service, planning and preparation of breakfasts, breads, and salads. Lab. 3, 2 hrs.; 3 credits.
- Foods I B. A continuation of the Foods I A course as applied to luncheons or suppers and dinners. A study of batters, doughs, cakes, cookies, and meats is included here. Lab. 3, 2 hrs.; 3 credits.
- Foods II A. A study of body needs, planning of dietaries, menus, and meals. Prerequisites: Foods I A and B. Lab. 3, 2 hrs.; 3 credits.
- Foods II B. A continuation of Foods II A, the actual serving of meals to small groups, and a detailed study of meats. Lab. 3, 2 hrs.; 3 credits.
- Foods III. This course is planned to help the girls realize the possibility of using their foods training to provide an income and to aid them in planning, preparing, and serving special foods for club meetings, ladies' aids, group suppers, buffet meals, teas, etc. Rec. and lect. 2 hrs.; 2 hrs. lab. as arranged; 3 credits.
- Home Management A. A study of the problems of management in the home including family and community relationships. Prerequisites: Child Care and Training, Foods I and II, Laundering. Rec. 3 hrs.; 3 credits.
- Home Management B. A continuation of Home Management A. Includes a study of possible vocations for the home economics trained girl. Rec. 3 hrs.; 3 credits.
- Home Management House. Senior girls spend eight weeks living in the practice house, where, with the supervision of a resident instructor, they actually manage the home, and care for a child. 8 credits.
- Child Care and Training. This course is designed to give an understanding of the place of the child in the home, through the study of the physical care and mental training of the infant and preschool child. Rec. 3 hrs.; 3 credits.
- Laundering. Includes care of laundry and utensils, study of water, soap, starch, removal of stains, washing of woolen and silk garments, ironing, and the principles of dry cleaning. Rec. 1 hr.; lab. 1, 2 hrs.; 2 credits.
- Social Training I A. The subject matter includes the study of conversation, table etiquette, dress, boy and girl relationships, and social correspondence. Rec. 2 hrs.; 2 credits.
- Social Training I B. Continuation of Social Training I A. Rec. 2 hrs.; 2 credits.

- Economics of Buying A. A general study of buying points for household supplies, such as clothing, equipment, and luxuries. Rec. 3 hrs.; 3 credits.
- Home Accounts A. Simple arithmetic as applied in figuring costs of what we produce and consume. The making of budgets and keeping of accounts as suited to needs. Rec. 3 hrs.; 3 credits.
- Home Accounts B. Continuation of Home Accounts A. Rec. 3 hrs.; 3 credits.
- Household Equipment II B. A study of the basic principles for the selection and use of large and small equipment used in the home. Lab. 2, 2 hrs.; 2 credits.

## CLOTHING AND RELATED ART

All materials for clothing courses must be selected in consultation with the instructor. Students are requested not to bring materials from home, unless arrangements have been made with the instructor. Each girl should have a thimble, tape measure, scissors, and needles.

- Clothing I A. Two aprons, a holder, a slip or panties, and Christmas gifts are made. Problems of darning and patching are required. A study of cotton materials is made, including wearing qualities and prices. Simple decorations, trimmings, and the cost of finished garments are discussed. Demonstration of sewing machine attachments. Lab. 3, 2 hrs.; 3 credits.
- Clothing I B. A study of cotton and linen dress fabrics; making pajamas, a simple wash dress, and a better wash dress. Simple problems in decorative needlework; discussion of clothing budget. Lab. 3, 2 hrs.; 3 credits.
- Clothing II A. Includes the study and making of a house dress for wear in foods classes and the Home Management House. A study of wool and making of at least one wool garment. The use of sewing machine attachments is studied and practiced. Prerequisites: Clothing I A and B, or equivalent. Lab. 2, 3 hrs.; 3 credits.
- Clothing II B. A study of silk fabrics, the making of a silk garment. A study of children's clothing and the making of one child's outfit. Lab. 2, 3 hrs.; 3 credits.
- Clothing III A. A course in make-over. Each student in conference with the instructor decides on the problem. A study of millinery is included. Prerequisites: Clothing II A and B, or equivalent. Lect. 1 hr.; lab. 3, 2 hrs. or lab. 4, 2 hrs.; 4 credits.
- Clothing III B. Each girl makes as many complicated garments as time will permit, in order to improve her technique. At least one dress or suit and a complete outfit for graduation are made. Lect. 1 hr.; lab. 3, 2 hrs. or lab. 4, 2 hrs.; 4 credits.
- Wardrobe Planning II A. This course is so planned that it enables the girl to plan clothes appropriate to various types, figures, and colorings, and which are suitable for long wear. Lect. 2, 1 hr.; 2 credits.
- Drawing and Design I A. Principles of design and color harmony with emphasis upon design as expressed in clothing, house furnishings, and articles in common use. Lab. 2, 2 hrs.; 2 credits.
- Drawing and Design I B. Application of design principles to costume selection and design. Lab. 2, 2 hrs.; 2 credits.
- Home Furnishings II A and B. Courses include the fundamentals of artistic home planning and furnishing, including finish of walls and floors, as well as selection of rugs or carpets, curtains, furniture, and pictures. Renovation of used furnishings is discussed and, whenever possible, carried out in the laboratory. Prerequisites: Drawing and Design, Landscape Gardening. Rec. and lect. 3, 2 hrs.; 3 credits each course.

- Crafts A. Application of the principles of design to the making of worth-while decorative household articles and personal belongings. Lab. 2, 2 hrs.; 2 credits.
- Crafts B. Continuation of Crafts A, with more advanced problems. Lab. 2, 2 hrs.; 2 credits.
- Art Appreciation A and B. Appreciation gained through the study of various forms of art, including pictures, ceramics, decorative objects, and costume. Rec. or lect. 2, 1 hr.; 2 credits.
- Home Nursing II A. Structure and function of the human body and personal hygiene. Rec. 3 hrs.; 3 credits.
- Home Nursing II B. Stresses the principles of first aid. Rec. 3 hrs.; 3 credits.
- Home Nursing III A. Home care of the sick, including prevention and care of communicable diseases. Rec. 3 hrs.; 3 credits.
- Home Nursing III B. Maternal and child hygiene. Rec. 3 hrs.; 3 credits.

### HORTICULTURE

- Fruit and Vegetable Crops. Planning, planting, culture, value, and management of the orchard and garden on the general farm. Rec. 3 hrs.; 3 credits.
- Landscape Gardening. A study of trees, shrubs, and flowers adapted to western Minnesota and the proper arrangement of these plants on the farmstead. Rec. 2 hrs.; 2 credits.

### MATHEMATICS

- Farm Arithmetic A (Boys). Training in simple mathematical processes, application of principles to problems requiring measurements of material, extension, capacity, with practical applications to farm work. Helpful in the mathematics of the technical school course. Rec. 3 hrs.; 3 credits.
- Farm Arithmetic B (Boys). Continuation of Farm Arithmetic A. Rec. 3 hrs.; 3 credits.
- Practical Mathematics. A course designed to assist students in making mathematical calculations which are somewhat beyond the scope of the courses in Arithmetic A and B. Particularly helpful to students in their more advanced mechanical courses. Rec. 3 hrs.; 3 credits. Prerequisites: Arithmetic A and B.
- Elementary Algebra A. Includes the study of symbols used in mathematics, the formula, simple equations, exercises and problems involving positive and negative numbers, the making and interpretation of graphs. Rec. 5 hrs.; 5 credits.
- Elementary Algebra B. Practice in multiplication, factoring, division, and fractions is followed by the study of fractional and literal equations, set linear equations, ratio, proportion, square root, radicals, and quadratic equations. 5 hrs.; 5 credits.
- Plane Geometry A. Begins with an introductory study of geometric terms, constructions and methods of proof. Includes propositions involving triangles, perpendicular and parallel lines, polygons and the constructions based upon them. Rec. 5 hrs.; 5 credits.
- Plane Geometry B. A continuation of Geometry A including the study of circles, angles and arcs, the measurement of angles and arcs, loci, proportional line segments, similar polygons, and area. Rec. 5 hrs.; 5 credits.

### MUSIC

Private musical instruction includes twelve private lessons and daily supervised practice periods. Music Hall is equipped with practice rooms for the use of music students. The fees for private lessons pay also for the use of a practice studio.

- Piano. Elementary training in scales, chords, arpeggios, and selected studies. Technical exercises for the development of the hands, fingers, and arms. Studies and compositions adapted to the individual student. 2 credits; fee \$7.
- Voice. Fundamentals of voice culture, breathing, placement, formation of vowels, diction, and flexibility. Studies and solos selected according to the ability of the individual student. 2 credits; fee \$7.
- Violin. Methods and studies by Grun, Fischel, Sevcik, Dancla, Kayser, Kreutzer, Rode, and Fiorillo. Solos adapted to each grade. 2 credits; fee \$7.
- Organ. For students sufficiently advanced in music. Hammond electric organ is used. 2 credits; fee \$7.
- Band and Orchestral Instruments. Carefully arranged courses in each instrument. Cello, trombone, clarinet, trumpet, saxophone, drums, etc. 1 credit; fee \$7.
- Freshman Vocal Study. A beginning course in vocal study for freshmen. Principles of musical notation, formation of scales, musical terms, sight reading, ear training, and the appreciation of music taught through participation in group singing. Rec. 1 hr.; 1 credit.
- Music Appreciation. A general survey of music intended to enlighten the listener of music. Form and analysis, instruments, and voices taught with the use of the phonograph and demonstration. Rec. 2 hrs.; 2 credits.
- Chorus. Both sacred and secular music are sung by this group. The chorus sings on Sunday evenings at the vesper service and furnishes music for assembly programs and concerts throughout the year. 2 credits.
- Orchestra. Two orchestras, one for beginners and one for advanced students, are organized at the beginning of the school year. Credit is given for membership in these organizations. 1 credit.

Group lessons are offered in piano, voice, and instruments. These are small classes for the benefit of those who do not desire to register for private instruction. 1 credit; fee \$1.50.

### PHYSICAL TRAINING

Gymnasium (Girls). All girls will be required to take gymnasium work during their entire residence at the school. Girls will be organized into classes for exercise, gymnastics, swimming, and games. 1 credit.

### POULTRY HUSBANDRY

- Management of Laying Flock. Principles of general management, house construction, important commercial breeds and types, feeding and culling for egg production; common ailments and treatments. Rec. 3 hrs.; 3 credits.
- Incubation and Brooding. A study of the best methods of incubation and brooding, natural and artificial, includes selection of breeds, eggs for incubation, feeding and care of chicks, how to avoid losses. Rec. 2 hrs.; 2 credits.
- Advanced Poultry Production. A seminar course for students especially interested in poultry production. Prerequisites: Management of Laying Flock, and Incubation and Brooding. Rec. 2 hrs.; 2 credits.

### SOCIAL SCIENCE

General History A. A study of world history during the ancient and medieval periods to the French Revolution, designed to show the social and political development of men and nations during these periods. Rec. 5 hrs.; 5 credits.



- General History B. A continuation of General History A from the French Revolution to the present time, with special emphasis on the growth and development of nationalism, and democratic and liberal reforms during this period. Rec. 5 hrs.; 5 credits.
- United States History. A course intended to present a clear account of the colonial backgrounds of the United States with greater emphasis on the recent industrial, economic, and social development of our nation. Rec. 5 hrs.; 5 credits.
- United States Government. A study of the background, organization, and functions of the national, state, and local governments. Rec. 5 hrs.; 5 credits.
- Rural Sociology. A study of social backgrounds, rural social institutions, and existing rural problems. Rec. 3 hrs.; 3 credits.
- Freshman Lectures. A noncredit course for beginning students, designed to aid them in adjusting themselves to the school, and to life.

### SCIENCE

- General Science A. To acquaint the student with the many happenings of everyday life and their relation to the sciences of chemistry, physics, and biology. Rec. 3 hrs.; 3 credits.
- General Science B. Continuation of General Science A. Rec. 5 hrs.; 5 credits.
- Agricultural Science A. A foundation course covering the fundamentals of botany, zoology, chemistry, and soils, and their relationship and use to agriculture. Rec. 2 hrs.; 2 credits.
- Agricultural Science B. A continuation of Agricultural Science A. Rec. 2 hrs.; 2 credits.
- Botany. A study of flowering plants, molds, mushrooms, rots or decays, and yeast. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.
- Chemistry A. A general introductory course in chemistry treating of the fundamental principles necessary for an understanding of chemistry in its relation to agriculture. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits; fee \$1.
- Chemistry B. A continuation of Chemistry A, with a more direct application to the chemistry of plants and animals. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits; fee \$1.
- Physics. A practical course in physics as related to agricultural engineering. Covering a study of the mechanics of solids, liquids, gases, heat, sound, and light. Rec. 5 hrs.; 5 credits.
- Conservation of Natural Resources. A study of the natural resources of the state, with special emphasis on the student's responsibility and opportunities for their conservation. Rec. 2 hrs.; 2 credits.
- First Aid (Boys). A course in junior first aid, as outlined by the American Red Cross. The course includes artificial respiration, and diagnosis and temporary treatment of all kinds of accidents. Rec. 2 hrs.; 2 credits.

### SUMMER HOME PROJECTS

#### AGRICULTURAL PROJECTS

From 2 to 10 credits will be allowed, depending on the quantity and quality of work. A charge of 25 cents is made for the record books made up by the school. Other record books and supplies are charged for at cost. Sequence in which project work must be taken is explained in Requirements for Graduation, on page 10.

Farm Accounts. Keep complete records of the farm business at home for six months. Submit the completed book at the close of the project year. Four reports will be required for the six months. This project may be carried for an entire year for extra credit.

- Personal Accounts. Those boys who are working out and unable to carry the Farm Accounts project may keep records of personal expenses for a period of six months. Submit bankbook or other evidence of saving, to indicate that at least 50 per cent of wages earned have been saved. Included in savings shall be evidences of old notes or bills paid, and clothing bought for personal use.
- Swine—Cost of Production. Take over the management of the swine herd, keep farrowing records, earmark litters if possible (extra credit for doing so), keep accurate labor, feed, and financial records, and submit the same monthly. Final report is also required.
- Swine—Ton Litter. For those who are enrolled in the Swine 4-H Club project, produce a ton litter, if possible, from one sow. Must be kept separate from other hogs. Keep labor, feed, and financial records, and submit same as called for.
- Swine Sanitation. Take over the management of the entire herd. Keep farrowing records. Pigs are to be raised on clean and sanitary ground, on which pigs have not been grown the previous year. The McLean System, or a modification of it, is expected to be carried out. Keep labor, feed, and financial records and submit same monthly. Sow testing may also be carried on with this for extra credit.
- Sheep Management. Take over the management of the flock. Ownership by student is desirable. Lambs should be creep fed for at least a month. Student should dock and castrate lambs and treat for stomach worms, and if necessary, dip sheep. Keep labor, feed, and financial records, and submit same as called for.
- Dairy Herd Management. Student assumes care of dairy herd on his home farm for at least six months, making regular reports in regard to feeding and management and keeping accurate accounts of milk production, butterfat test, feed consumed, etc.
- Horse Management. Take over the management of the horses on the farm. Not less than four horses. Keep records of work done by horses, feeds fed, time spent in caring for horses, and submit records monthly. Final report, including summary of financial and labor records.
- Beef. Intended for boys in the 4-H Beef Club project. Fatten a baby beef and keep accurate feed and labor records of the same. Submit records as called for by supervisor. Extra credit given to students who reach Junior Livestock Show with their beef animal.
- Incubation and Brooding. Course in poultry work required as prerequisite. In this project 100 or more chicks, or 50 poults, are brooded, fed, and raised by the student. Poultry must be kept on clean ground or screen, up to 12 weeks of age. A definite ration is fed throughout the project, and accurate feed and labor records are kept.
- Beekeeping. In this project the student takes charge of an apiary of not less than ten hives. Care and management of the bees and production records are included as a part of the project.
- Fruit Growing. Management of the home orchard for one season. The work will consist of pruning, cultivating, spraying, harvesting, and preparing the orchard for winter. Cost records are kept.
- Home Beautification. Planning and planting foundation shrubs and plants around the farm home and other buildings, caring for the same during the growing season, and preparing for winter. The student makes a planting plan which is approved before the work is undertaken. At least one farm building must be completely planned for and planted.

- Tractor Operation. A study of the management and operation of the tractor on the home farm, including cost of fuel and oil, repairs, etc., and complete records of work done.
- Farm Woodwork. Make five small articles, or two larger ones, selected from list prepared by supervisor, or build one small farm building. Keep farm tools in good condition. Submit records during the summer and a final report before August 1.
- Potato. Grow one-half acre or more of a standard variety to be compared with one-half acre or more of one of the new varieties of potatoes developed by the University of Minnesota, such as the Warba and Katahdin. If possible, select and show peck sample of potatoes at county fair. Keep cost of production and labor records, and submit reports as called for.
- Garden. Grow a garden of at least 5,000 square feet. Prepare a garden plan and submit it to the project supervisor. Keep yield, labor, and financial record and submit reports as called for.
- Corn—Varietal Comparison. Plant at least one-half acre of one of the improved hybrids of the University of Minnesota, alongside at least a similar amount of local farm variety. Record of labor and costs required, and reports to be submitted as called for by supervisor. Yields to be checked by county agent. Make application through your county agricultural agent for 5 pounds of seed for this project.
- Crops—Varietal Comparison. In this project students will make a comparative yield trial of a standard recommended variety of grain with a farm variety. At least one acre or more to be grown alongside an equal amount of their home variety and wherever possible the two varieties cut and threshed separately for determining yields. Square yard samples to be taken by student for yield check. Prerequisite: Cereal Crops course.
- Windbreak Planting. Plan, plant, and care for a standard windbreak around the farmstead. Plan to be submitted to supervisor before project is started. Keep labor and cash records and submit reports as called for.
- Weeds I. Involves a study of the most noxious weeds on the home farm. Students registered for this project are required to identify and describe at least twenty-four different kinds and make a weed seed and plant collection of same.
- Weeds II. Make a collection of forty-eight noxious weed seeds, together with the plants. If the student has already received credit for Weeds I project, the weed case from it must be submitted with the two required for this.
- Weeds III. Select a patch of ground infested with quack grass or some other noxious weed. Practice cultural methods to eradicate the same; keep a financial and labor record and submit reports as called for during the summer.
- Farm Improvement. Plan a comprehensive program of farm repair, improvement, and beautification work, such as fencing and building repairs, painting buildings, cutting and killing weeds, cleaning out orchard and woodlot, rearranging or repairing smaller outbuildings, etc. Submit plan to supervisor at beginning of the project. Keep labor and cash record and submit reports as called for by supervisor.
- 4-H Club Leadership. Must be a junior leader of a standard 4-H Club; must take part in county, state, or interstate events through an exhibit or as a member of a demonstration or judging team, must submit a report of all work done on the regular 4-H Club Work Leadership Report Blank, and in addition a report of regular 4-H Club project carried.

Community Club or Church Leadership. The student will submit the annual program of work and meetings, as outlined by the officer and committee of the organization. Record shall be made of the part the student had in this program. Wherever possible, the student shall help with all regular meetings and help plan and participate in any special events, such as local or county picnics or other activities sponsored by the organization. This report shall be supplemented by a scrapbook, including newspaper and poster advertising, snapshots, and any other illustrative material which will better picture the student's work in the organization.

Alumni Relationships. Secure a list of all alumni and former students of W.C.S.A. living within a reasonable radius of one's home territory, contact them by letter or in person, arrange an Aggie-Alumni reunion, prepare publicity, send in three news items for *Projector*, and promote alumni relationships in every way possible. Reports required.

#### HOME ECONOMICS PROJECTS

Canning Fruits and Vegetables. The student will can not less than twelve quarts of vegetables, including two or more kinds, and not less than twelve quarts of fruit, including two or more kinds, and not less than six glasses of jelly. Records of methods, time, and costs are made a part of this project. 2 credits.

Baking. Includes the baking of not less than eight bakings of yeast bread and rolls, and the baking of quick breads until a standard product is obtained with a record of time, costs, and materials. 2 credits.

Foods and Cookery. Includes the preparing of salads, salad dressing, cakes, pies, cookies, puddings, and other simple desserts. Each product is made and scored at least three times. 2 credits.

Home Management. Includes the planning and preparation of all meals in the home for a period of two weeks. 2 or 3 credits.

Garment Making. Making a dress for self or for another member of the family. A record is to be kept of the time and cost. Credit will be given according to garment made and material used. 1 to 3 credits.

Clothing Repair. Not less than 15 articles of clothing and household linen are to be repaired. A record is kept of time and expenses, and money saved. 1 or 2 credits.

Laundering. This project includes doing the family laundering for four weeks, dry cleaning, stain removal, etc. 1 or 2 credits.

Children's Clothing. Consists of making a layette for a baby, or two suits or dresses for a small child. 2 credits.

Make-Over. In consultation with instructor the student will arrange to make over some garment before leaving school. After the work is completed, it is to be approved by the instructor before credit is given. 2 credits.

Home Furnishing. Includes the redecorating of a room, including walls, wood-work, and furniture, making of curtains, etc. 2 or 3 credits.

Working Out. In this project, with the approval of her employer, the girl keeps a careful and complete record of her daily tasks. 2 to 4 credits.

Personal Accounts. Records are kept of personal expenses for a period of six months. Bankbook or other evidence of saving should indicate that at least 50 per cent of earnings have been saved. Payment of old bills and notes and clothing bought shall be included as savings. Credit will be based on merit of record submitted.

*The Bulletin of the*  
UNIVERSITY of MINNESOTA

General College of the University  
1941-1942

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Volume XLIV, Number 50

August 9, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

# UNIVERSITY CALENDAR

1941-42

## *Fall Quarter*

1941			
September	15	Monday	Extension registration first semester begins
September	22	Monday	Entrance tests
September	22-23		Registration for Freshman Week for all new students entering the freshman class
September	22-26		Examinations for removal of conditions Medical examinations Registration period, <sup>1</sup> College of Science, Literature, and the Arts, and General College
September	24-27		Freshman Week
September	25-26		Registration days <sup>1</sup> for all colleges not included above. Payment of fees closes for all students in Science, Literature, and the Arts, General College, Education, Public Health Nursing, Medical School, Medical Technology, and for new students in other colleges except Graduate School
September	29	Monday	Fall quarter classes begin 8:30 a.m. <sup>2</sup> First semester extension classes begin <sup>3</sup>
October	4	Saturday	Last day for extension registration without penalty
November	1	Saturday	Homecoming Day
November	8	Saturday	Dads Day
November	11	Tuesday	Armistice Day; a holiday (except for extension)
November	20	Thursday	Thanksgiving Day; a holiday
December	12-13 and 15-18		Final examination period
December	18	Thursday	Commencement Convocation Fall quarter ends 6:00 p.m. <sup>4</sup>

## *Winter Quarter*

December	26	Friday	Payment of fees closes for all students in residence fall quarter in undergraduate colleges
1942			
January	2	Friday	Entrance tests
January	2-3		Registration <sup>1</sup> for new students in all colleges except the Institute of Technology. Payment of fees closes at 12:00 noon, January 3 for students in all colleges except the Graduate School
January	5	Monday	Winter quarter classes begin 8:30 a.m. <sup>2</sup>
January	26	Monday	Extension registration second semester begins
February	7	Saturday	First semester extension classes close
February	9	Monday	Second semester extension classes begin <sup>3</sup>
February	12	Thursday	Lincoln's Birthday; a holiday (except for extension)
February	14	Saturday	Last day for extension registration without penalty
February	19	Thursday	Charter Day Convocation

See page 3 for footnotes.

February	23	Monday	Washington's Birthday; a holiday
March 13-14 and 16-19			Final examination period
March	19	Thursday	Commencement Convocation
			Payment of fees closes for all students in residence winter quarter in undergraduate colleges
			Winter quarter ends 6:00 p.m.

*Spring Quarter*

March	27	Friday	Entrance tests
March	27-28		Registration <sup>1</sup> for new students in all colleges except the Institute of Technology. Payment of fees closes at 12:00 noon, March 28 for new students in all colleges except Graduate School
March	30	Monday	Spring quarter classes begin 8:30 a.m. <sup>2</sup>
April	3	Friday	Good Friday; a holiday (except for extension)
May	9	Saturday	Mothers Day
May	14	Thursday	Cap and Gown Day Convocation
May	30	Saturday	Memorial Day; a holiday (except for extension)
June	5	Friday	Second semester extension classes close
June 5-6 and 8-12			Final examination period
June	7	Sunday	Baccalaureate service
June	12	Friday	Spring quarter ends 6:00 p.m.
June	13	Saturday	Seventieth annual commencement

<sup>1</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 58, Bulletin of General Information. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>2</sup> First hour classes begin at 8:15 a.m. at University Farm.

<sup>3</sup> This date does not refer to correspondence study courses, which may be started at any time during the year.

<sup>4</sup> Extension classes continue to Saturday, December 20, and will resume Monday, January 5, 1942.

# GENERAL COLLEGE OF THE UNIVERSITY

## ADMINISTRATION

Walter C. Coffey, M.S., LL.D., Acting President of the University  
Malcolm M. Willey, Ph.D., University Dean and Assistant to the President  
T. Raymond McConnell, Ph.D., Directing Chairman, Advisory Committee  
Horace T. Morse, Ph.D., Assistant Director  
Alfred L. Vaughan, Ph.D., Secretary, Administrative Committee  
Edmund G. Williamson, Ph.D., Dean of Students  
Anne D. Blitz, M.A., LL.D., Dean of Women  
John G. Darley, Ph.D., Director of the University Testing Bureau  
William S. Carlson, Ph.D., Director of Admissions and Records  
True E. Pettengill, M.S., Recorder

## ADVISORY COMMITTEE

J. William Buchta, Ph.D., Professor of Physics and Chairman of the Department of Physics  
Edward M. Freeman, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics, and Chief of the Division of Plant Pathology and Botany  
Charles A. Koepke, M.S.(M.E.), Professor of Industrial Engineering and Administrative Assistant in the Institute of Technology  
T. Raymond McConnell, Ph.D., Associate Dean of the College of Science, Literature, and the Arts, Chairman of the Committee on Educational Research, Professor of Education, and Directing Chairman of the General College Advisory Committee  
Horace T. Morse, Ph.D., Assistant Director of the General College, Associate Professor of Education, and Recording Secretary of the General College Advisory Committee  
Homer J. Smith, Ph.D., Professor of Industrial Education  
John T. Tate, Ph.D., D.Sc., Professor of Physics and Dean of the College of Science, Literature, and the Arts  
Roland S. Vaile, M.A., Professor of Economics and Marketing  
Alfred L. Vaughan, Ph.D., Associate Professor of Physical Sciences and Secretary of the General College Administrative Committee

## FACULTY

John E. Anderson, Ph.D., Professor of Psychology and Director of the Institute of Child Welfare  
Francis S. Appel,\* M.A., Assistant Professor of English  
Gertrude M. Baker, M.A., Associate Professor of Physical Education for Women and Acting Director of the Department of Physical Education for Women  
Arthur H. Brayfield,\* M.A., Instructor in Vocational Orientation  
Margaret L. Brew, M.S., Assistant Professor of Home Economics  
Helen G. Canoyer, Ph.D., Assistant Professor of Economics  
William S. Carlson, Ph.D., Instructor in Psychology

\* Available for student counseling and program advising.



- Ralph D. Casey, Ph.D., Professor of Journalism and Director of the School of Journalism
- Asher N. Christensen, B.A., Associate Professor of Political Science
- James H. Dean,\* B.A., Instructor in Individual Orientation
- Delwyn B. Dusenbury,\* M.A., Instructor in Oral Communication
- Millard S. Everett, Ph.D., Assistant Professor of Philosophy
- Lucille Fisher,\* B.S., Instructor in General Arts
- Edwin H. Ford, M.A., M.S., Assistant Professor of Journalism
- Vetta Goldstein, Assistant Professor of Home Economics
- Edwin L. Haislet, Ed.D., Assistant Professor of Physical Education
- John L. Hamilton, B.S., Teaching Assistant in Film and Drama
- Edgar Hardy, Ph.D., Instructor in Physical Science
- Dale B. Harris, M.A., Instructor in Child Welfare
- Gerald Hill,\* B.A., Instructor in General Arts
- Signe T. Holmstrom,\* M.A., Instructor in Home Life Orientation
- Robert T. Jones, B.S.(Arch.), Professor of Architecture
- Hedda Kafka, M.A., Instructor in Home Economics
- Milton F. Kernkamp, Ph.D., Instructor in Plant Pathology
- Evron M. Kirkpatrick, Ph.D., Assistant Professor of Political Science
- Robert A. Kissack, Jr., M.A., Assistant Professor and Director of Visual Education
- Lorraine Kranhold,\* M.A., Instructor in English
- Howard P. Longstaff, Ph.D., Associate Professor of Psychology
- T. Raymond McConnell, Ph.D., Associate Dean of the College of Science, Literature, and the Arts, Directing Chairman of the Advisory Committee, and Professor of Educational Psychology
- Frank G. McCormick, B.A., LL.B., Professor of Physical Education for Men and Director of Athletics
- Lennox A. Mills, Ph.D., Associate Professor of Political Science
- Horace T. Morse,\* Ph.D., Assistant Director and Associate Professor of Education
- Clarence Osell, M.S., Instructor in Physical Education for Men
- Roger B. Page,\* M.A., Instructor and Research Counselor
- Walter H. Peters, M.Agr., Professor of Animal Husbandry
- Robert A. Phillips, B.S., Instructor in Gardening
- Ralph A. Piper, M.A., Assistant Professor of Physical Education for Men
- Carl J. Potthoff,\* M.D., Associate Professor of Biological Studies
- Mary J. Shaw, Ph.D., Assistant Professor of Orientation
- Helen M. Starr, M.A., Assistant Professor of Physical Education for Women
- Ella A. M. Thorp, B.A., Instructor in Mathematics
- Alfred L. Vaughan,\* Ph.D., Secretary of the Administrative Committee and Associate Professor of Physical Sciences
- Arthur N. Wilcox, Ph.D., Assistant Professor of Horticulture
- Cornelia D. Williams,\* Ph.D., Instructor and Research Counselor
- Elmo C. Wilson,\* M.A., Lecturer in Social Studies and Journalism
- Hedvig Ylvisaker,\* Ph.D., Assistant Professor of Social Studies

\* Available for student counseling and program advising.

## GENERAL STATEMENT

The General College of the University is carefully designed to offer students the chance to get a general college education. General education is different from, and complementary to, special training for a job, for a profession, or for scholarship in a particular field of knowledge. Special training is important. Fine scholarship in a narrow line is excellent. Such training alone, however, is not enough to help get us ready for all of our living. We spend less than a third of our lives in work. A much greater share of our time is spent in living with our families, bringing up children, playing at our hobbies, relaxing in sleep or recreation, and attending to our rights and duties as citizens.

Out of these things, which we do away from the job, come many of our greatest satisfactions. If not, then living grows futile and sour no matter what or how good our job may be. Young men and women may spend years getting training for their life work. However, if their marriages crack up in divorce, if their nerves grow too tense because they do not know how to get the best out of play, sports, or radio, their work itself goes stale. While none of us can discount the importance of work or of college training for certain kinds of jobs, neither should we discount the importance of training ourselves for living. We do not learn to play, or to appreciate music, or to manage our homes, or to vote, "by instinct" or "by nature." These things must be hungrily sought and learned and trained for. There was a time when such needed education was acquired more or less informally; this is no longer possible.

All of us lead many kinds of lives. We are human animals living in a biological world. As such we have many and continuous problems of health and disease, food, sleep, exercise. We need to understand as laymen, not as specialists, the functions and services of doctors, nurses, clinics, and hospitals. General education offers, therefore, courses in human biology. We are thinking and feeling beings. Our thinking and emotions set us in ways of behaving. To understand ourselves and others, general education offers courses in psychology dealing with family relations, personality, intelligence, and attitudes. We play our roles likewise as sons or daughters, husbands or wives, and parents. We are buyers of goods and services. We go to the movies, the symphony concert, the art gallery; we listen to the radio. We live in a world of powers and gadgets provided by science and engineering ranging from the plane, speedliner, or family car to the electric egg beater in the kitchen or the camera we take on vacations. We are responsible neighbors and citizens in a complex and swiftly changing democratic society. As such we cannot afford to leave the whole management of that society to others, but must study and help with its problems ourselves and prepare to keep it growing in healthy, democratic ways.

With all these ways of living the General College concerns itself. A study of the courses described in this bulletin will show this purpose of the college. They are not substitutes for courses in the other schools and colleges but are useful and valuable in themselves, rounding out the education needed today. The future specialist in art or economics or medicine needs this general education perhaps as much as does the

student who has the time, money, health, interest, or abilities for only a year or two of college. These new courses tend to build in the mind of the student a background of understanding of the present world, of his part in it, and of himself. They give him a vital look into *what* other men and women do. They teach him also *why* and *how* things are done. They should, therefore, serve to satisfy his mental curiosity, and to get him ready for more satisfying living in his public and private relations.

The University General College courses are open to any student admitted to the University. The college requires graduation from an accredited high school or the passing of the university entrance tests, but it does not require any specific pattern of high school subjects. The college provides its courses especially for the following students:

1. Those who desire to study courses not offered in other colleges. General College courses are designed to satisfy the needs stated above. They do not duplicate or rival, but complement, the specialized study of other colleges.

2. Those who, for financial or other reasons, have only a limited time to give to college training. Nearly half of all students who enter the University drop out before the beginning of the junior year. There are many causes. Some find themselves unable to get jobs to support themselves in college or money from their families for long training, but are, nevertheless, able to have a year or more. Others, through illness, are forced to leave. Others find and prefer to take a full-time job instead of going on with study. Others marry. Others need only two years of general training before going into work in special fields or to art, music, stage, business, or mechanical schools outside the University. Others find themselves unable or unwilling to build up in themselves the attitudes of mind and the habits of bookish study demanded to carry on into professional work.

3. Students who apply to enter other colleges, but who are advised to enter the General College because their high school record and entrance test results indicate mediocre or poor studentship in the past, and whose success in their chosen specialized courses is very doubtful. The General College offers these students three opportunities: (a) to build effective study habits and to prove that their professional goal is achievable; (b) to develop a drive toward a different achievable job goal; (c) to round out their general education in nonprofessional training. Any of these students whose work in this college meets the standards of the appropriate college may transfer at the end of three or more quarters.

4. Those who need and wish general orientation in the choice of, and general preparation for, a vocation. Most students are not aware of the varieties of satisfying and useful work which may fit their desires, interests, and abilities until they have surveyed such fields of activity as are dealt with in the courses in the General College of the University. Moreover, a good deal of general training is profitable as preparation for a specific vocation.

5. Those who transfer from the college which they first entered to the General College with the approval of the administration of both colleges.

6. Those who transfer from other institutions who do not meet the standards for advanced standing of the college to which they apply.

Since a large number of the students who enter the University come within one or more of the above classifications, it is clear that the General College serves the needs of these students more fully and with greater economy to themselves, their parents, and the state than was

possible before its establishment. Since under working conditions in many occupations outside the professions it is possible to get special training on the job, one or two years of college work in the field of general education may be sufficient for many students.

Many parents and students are not aware of the very keen and strenuous competition that has developed for places in most professional schools and in the professions themselves after college. A boy who wants admission to one of the professional schools of the University has only one chance in six of being chosen for admission. Unless he has had a good study record in high school, tests high in the achievements, interests, and skills demanded for this professional training, his chances are less than one in one hundred. A large majority of the students coming to the University shoot for the wrong mark or for a mark beyond their range. It is the business of the University and of the General College to help students to understand themselves, to help them find out what goals for them are achievable, and to put them on their way.

The faculty of the General College is composed of a core staff and of members of the teaching staffs of the other schools and colleges of the University. They bring to our overview courses the results of their years of study and experience in the fields of their specialties, to summarize and apply for General College students the latest discoveries in special departments of knowledge. They weave these materials into a comprehensive, realistic, vivid picture of the modern world.

From the foregoing, it is obvious that the General College of the University is by no means intended to replace or rival any other unit in the University or any other existing two-year college in the state. It is neither a preparatory nor a vocational training school. It is not a college for the lazy and incompetent. Students of superior academic ability who have needs and interests which may be served by the type of courses provided may enroll in the General College upon the recommendation of a member of the faculty of the University and consultation with one of the administrative officials of the General College.

## FOREWORD TO STUDENTS

The General College of the University is your college. It has been built to try to satisfy your desires, to fulfill your needs. In order to learn what these needs are the college has studied carefully the former students in this college as well as 950 former students in the University who had been out from five to twelve years. In its planning, the colleges and departments of the entire University have cooperated to make its courses attractive and valuable. But your growth and success in this college depend not upon it but upon you. You start on this job, on an adventure in education based upon principles that have long been tested and found good. Upon what you do now—the right things and the wrong things, the mistakes and the triumphs—are dependent, in a way you can only vaguely guess at, the successes and failures of your future at work, at home, and at play. You are asked, therefore, from the first day of Freshman Week to make the organization and development of your education your first business.

All education is self-education. We offer you courses and instructors but you must take them. No course is complete in itself. It serves merely as a guidebook and opens up for you fields to explore by study, observation, reading, and conversation. Some students take courses as some people read guidebooks—in an easy chair. Others tighten their belts, take the guidebook in hand, and go to find out. To the latter, no courses are easy because there is no end to what can be found out and looked at. To them no courses are uninteresting because each is the beginning of an adventure in the discovery of new things.

**Making yourself at home.**—Your first and continuous job at Minnesota is to make yourself at home. You come here to a strange student city of thousands housed in many buildings on two campuses. Your satisfactions from, and efficiency in, getting the most out of your college life will come from knowing your way around; from getting acquainted with your fellow students, with the faculty who teach you, and with the organizations in athletics, music, dramatics, debating, literary, and social fields which you may join for your pleasure and profit. And you should know your buildings and classrooms, your library, health service, study halls. For information on fellowships, scholarships, and loans see the bulletin *University Aids for Student Expenses*.

Other bulletins published by the University will also contain useful and helpful material. For information about the organization of the University as a whole, its various colleges, courses, and degrees, as well as tuition, expenses, and entrance requirements, see the Bulletin of General Information. Special bulletins are published about the Library and student personnel work, and much that will be immediately useful to you appears in the *Introduction to the University* (Freshman Week Handbook). If the recorder does not send you these bulletins or you do not receive them from someone early in Freshman Week, you may obtain them by asking for them at the information window in the recorder's office in the Administration Building. They are all well worth having. Read them carefully as soon as you receive them and keep them for future reference.

**Finding a room.**—When you first arrive you will want to find room and board. These matters are important to your health, comfort, and efficiency in college. In selecting a room you should consider heating, lighting, quiet, and cleanliness; its convenience to the campus or car lines; its furnishings, especially the bed. You spend nearly a third of your life in bed, and it pays to get a good

one. You should not hesitate to look at several rooms until you find just what you want. At first, you should board at the Coffman Memorial Union or nearby restaurants until you have found your room and are ready to choose a permanent place to eat. Then pick carefully. If you are away from home for the first time you will be wise to give attention to getting enough of the right kinds of things to eat and at regular times. This is a matter of importance to your health. A list of approved boarding and rooming houses for all students may be secured at the Housing Bureau. For further information on dormitories, rooms, and boarding places, and the rules governing them refer to pages 41-46 of the Bulletin of General Information.

**Taking part in Freshman Week.**—Full and active participation in Freshman Week will help you to wear away the preliminary strangeness and give you the first sense of freedom that comes from familiarity with this place where you are to live for several years. During this first period it will pay to keep your wits about you, to remember things you see and hear rather than to look upon Freshman Week wholly as a big reception and a good time. A word of warning! Wherever humans congregate, there is gossip and misunderstanding. Many times these lead students to fear and misery. In order to avoid such trouble find out the facts. Find them out by going directly to headquarters. Ask your professors, your administrative officers, your student council members, or whoever may be responsible and authoritative. Don't, once again, take rumor for fact.

**Required diagnostic tests.**—It is important that you take the full battery of required diagnostic tests, part of which will be scheduled during Freshman Week and part on a day to be announced later during the first weeks of classes. All students in all colleges are required to take diagnostic tests; each college requires those that will be most helpful later in working with its students. Costs of giving, scoring, and interpreting these tests are partially paid by a fee of fifty cents per quarter charged to each student in the University.

These tests do not have any effect on marks in college courses. They are, nevertheless, required so that we may know you better and can help you make plans for a more worth-while college program. A counselor of this college will be glad to explain and interpret the results of these tests to you when they are available, which will be early in your first quarter. You should avail yourself of this service by making an early appointment in Room 300, Wesbrook Hall.

**Planning your course.**—The next problem that confronts you is the planning of your course in this college and your registration. In this you will have help, for time will be made available to you in Freshman Week for conferences with the faculty and administrative staff in this college. Before these conferences, read the descriptions of the courses set forth in this bulletin and plan tentatively the combination you would like to take. This will give you something definite to carry to your first conference. Also before you meet your adviser it would be sensible to appraise yourself, your motives in coming to college, your needs and desires for various kinds of information and knowledge. Such frank self-examination is the best of all bases for planning anything you do. Altho your registration will be for only a quarter at a time, it is by all means best, even in your first quarter, that you look ahead and plan tentatively your program for the year.

**Beware of narrow interests.**—Some of you will have special interests, for example, social sciences. You will be inclined to select for your program subjects which center in the social sciences. You will probably write down as your courses, first, Contemporary Society, second, Our Economic Life, third, Func-

tions and Problems of Government, and fourth, Formation of Public Opinion. With these and physical education, your program is full—and narrow. You are urged to avoid this narrowness. You should not make the mistake of putting a tight practical limitation on what you study. In such a course as that outlined you have neglected wholly the fields of physical and biological sciences, art, literature, eutenics, and psychology. None of these can you really afford to miss if you consider the long future and what may contribute to your human appreciation and happiness.

Others of you may have specific needs or weaknesses which should be considered in planning your course. If, for example, you find it difficult to express yourself, you should take a course in Oral Communication or the Writing Laboratory or both. If you are having difficulty in getting along with people, the courses in Individual Orientation and Personal Adjustment may help you. It is good strategy to attack weaknesses in your academic preparation as well as in football or in war.

**Learning new fields.**—Some of you will have no special interest and should, therefore, take as widely varied a course as possible in order to sample the fields of knowledge, to satisfy your curiosity, and to test your interests and abilities. By such a survey you should, in time, find the fields that most keenly interest you and be able to plan an intelligent future course of study and recreation. It might be wise in selecting such a diverse program to pick out fields you know little about rather than those in which you know something or much. Thus, if you know little of land economics and the contribution of plant and animal life to human welfare, take Basic Wealth. Many women students will profit by the course in Physical Science Studies; many men students, by courses in art and music. Both groups will be benefited by courses in Home Life Orientation and Eutenics.

**Adjusting to college classes.**—When you enter your first classes, you will find a considerable adjustment to make. In high school you usually had small classes and discussion groups. Here you will be on your own responsibility. Many of your classes will be large and will be taught by lectures and demonstrations. Under such a change you must be wary lest you slip into bad habits of just half listening or watching instead of being constantly alert and active in the taking of notes and in getting the full meaning of the materials as they come from the lecturer. The lectures, demonstrations, syllabi, and reading lists and library facilities are furnished by the University as tools with which to do your own work. You are working for yourself, to educate yourself. The responsibility lies with you, not with us nor your parents. You should, therefore, constantly guard also against falling behind in your work, in your reading, note taking, preparation of papers and reports. Many student failures are the result of such habits.

**Establishing a routine.**—Back work is much more difficult than work ahead. Day-by-day established routine of habit is the only thing that brings satisfactory results. Only by such a process can you possibly prepare for the comprehensive examinations that are given at the end of each year and the preliminary quizzes and quarter examinations that precede them. In these matters you are your own master; you control your own academic fate. The University has, however, for your aid in making these adjustments, established certain agencies.

**Your counseling program.**—The General College is built around the idea of education for living in all the basic relationships of life. It uses two means for providing you with the needed experiences. The first is your classwork in which you become acquainted with broad fields of knowledge and experience which should

have a profound effect upon all your thinking and acting. The second is your counseling program in which we try to help you weigh your strengths and weaknesses, aiding you through this personalized service still further to achieve your most satisfactory life adjustment here and after college. Your individual efforts to reach such an adjustment should be the center from which all your education proceeds.

The University maintains an extensive personnel program to help you in solving your individual problems. This program includes the following agencies and individuals: the University Health Service, available for special diagnosis and treatment of your health problems in physical and mental well-being; the Speech Clinic, for special diagnosis and treatment of defective speech habits and related disabilities in reading, writing, and spelling; the University Testing Bureau, for the analysis of your vocational assets and liabilities and information regarding their use in job competition or job training programs; the Employment Bureau, which may be able to assist you in getting part-time jobs for self-support; special faculty counselors in the various colleges who are in a position to give you specific information about courses, job requirements and opportunities, and specialized material in their own fields.

At some time or other you can profitably make use of one or several of these agencies. It will be the job of your General College counselor to talk over your problems with you, to isolate your particular needs for student personnel services, to see that such services are made available to you, and finally to interpret the results in such a way that you can work out the solution of your own problems. Space does not permit us to list in detail the possible problems you may want to have cleared up. They range all the way from a mild lack of interest in a particular course to more serious difficulties, such as a major discrepancy between your opportunities and your ambitions or a severe emotional upset. In the counseling service we can help you strike a satisfactory balance between your interests and your abilities and opportunities. It has been set up to work with you; you should use it.

**Extracurricular activities.**—Student life at the University includes many other activities besides those of the classroom. Some of you may be socially inclined, and for you there are the fraternity and sorority. Some may like and have ability for athletics and games, and for you the varsity and freshman sports are open. Still others may be interested in dramatics, debating, music, publications, or student government. The Student Council of this college is an active organization. While its official membership is limited to fifteen, many other students have an opportunity to become acquainted with, and participate in, its work through special activities in which it is engaged. A student convocation is held early in the quarter to acquaint students with the work of the council. These activities are open to all students and such activity may aid materially in making your university career more happy and meaningful. To get advice, go to headquarters for your information; call on those who are in charge of various student activities. The dean of students and his assistants are always ready to help and advise students in these matters. Some of these activities are time consuming and it behooves the student to work out for himself the proper balance between studies and participation in extracurricular affairs.

**Your attitude and behavior.**—We repeat: the General College of the University is your college. In matters of behavior you must live in this college community on the assumption that your fellow students are decent people to live with; that each attends to his business and to the business of the college to the best



of his ability; that what is expected of you is what is expected of acceptable members of society; that class meetings, quizzes, and other scheduled engagements are appointments to be met except in cases of emergency; that much of your college experience will be to your profit or waste in proportion to the generous, kindly, and courteous general spirit you show. In other words, you are on demonstration before the college staff, the administration, and others. You will be judged on your behavior in the broadest sense. Psychologists know that childhood behavior carried over into college life in such forms as cheating, whispering, and rowdyism is dangerous since it prolongs bad habits and interferes with the progress of others. If one cheats, he cheats only himself. If he is inattentive or noisy, he robs himself and others of instruction. The responsibility is yours.

## INFORMATION FOR STUDENTS

In this section we have attempted to set down answers to the most common questions students ask. It is important that you read the following paragraphs carefully. If you know the details of college procedure, the rules and regulations of the college, the requirements for the degree, and other information, it becomes easier to plan your own education; it will keep you from getting into trouble and smooth the way; and it will be possible for you to get your problems settled more quickly and satisfactorily. The administrators of the General College and their associates are available for conference at all times by appointment, and they ask that you come whenever you want help.

### REQUIREMENTS FOR THE DEGREE OF ASSOCIATE IN ARTS

Because in the General College we work on the principle that education should make you clearer day by day about the basic aspects of life and help you to grasp broad fields of knowledge rather than to pile up course credits, we have set up a series of comprehensive examinations by which to test yourself. Altho course quizzes, examinations, and grades will be given to indicate your progress in course work, your progress toward the degree will be measured by how you perform on the comprehensive examinations and by your completion of the requirement of physical education. The requirements for the degree of associate in arts are as follows:

1. The passing of comprehensive examinations. For details see pages 18-20.
2. For both men and women, the completion of three quarters of physical education.
3. A final medical examination by the University Health Service a few weeks before commencement. Announcement of the time of this examination will be made in the Official Daily Bulletin and on the bulletin boards of Westbrook Hall.

### PLANNING A PROGRAM

*Students will normally plan a program of courses which will enable them to complete their preparation for taking the required comprehensive examinations at the end of three quarters of residence in the General College.*

To modify this general rule in terms of individual abilities, interests, and needs you must ask approval of your adviser. Such changes may increase or decrease the time necessary to complete preparation for the required comprehensive examinations and to get the degree of associate in arts.

Knowledge of the scope and purpose of the comprehensive examinations (pp. 18-20) and the courses as set up in this bulletin (pp. 23-62) is essential for the successful planning of a program. You should study the bulletin thoroly if you are considering entering the General College or wishing to plan later course work. You will be wise to look ahead and to plan work over a two-year period or longer. By doing so, your road ahead is clear and you can travel it well. The important points for you to consider in planning a college education are: the job you want to hold five or more years from now; the kind of person you would like to be; the sort of home and family life you most want; the kind of neighborhood and town you want to live in. With these things in mind, you can then sensibly ask what college can do, particularly this college, to help you on your way towards these

self-set goals. You can ask what abilities you have. You can then plan your courses, time for study, and your college social life.

Staff members are assigned to each of you for program advising. Your adviser will help you through the rush of fall registration, and before the first quarter ends, you will be better acquainted and your future program will be pretty well worked out. You should plan to carry as much work as you can with reasonable effort do well. Health, outside work, and other legitimate reasons make this a variable amount. Changes in a program may be made after a quarter begins but these should be thoughtful changes based on previous thoughtful program planning.

### MODIFICATIONS IN PROGRAMS

1. **Self-support.**—Many students are able to attend college only by working for their partial or complete support. If you have a job that requires a large amount of time, plan with your adviser to cut down your course and comprehensive program. Your struggle to get an education is fine enough, but do not try to do two full-time jobs at once. Such an effort usually results in low grades or poor health or both, and consequently greater loss of time than if you had planned from the beginning on stretching out the time for preparing for the degree.

2. **Health.**—Through co-operation with the University Health Service the General College is able to discharge one of its duties to its students, that of watching their health and instructing them, through its courses, in problems and methods of health care. But such a service is worthless without your co-operation. If you have poor health your adviser will suggest that you carry a lighter program and that you take more time to complete your preparation for the degree. This is wise because experience has shown that students who, in spite of poor health, try to carry a full load, usually lose so much time and receive so little from their study that college has not been worth while.

3. **Courses in other colleges.**—The General College draws upon the resources of the University to extend its services to students, and as a part of program planning in terms of students' abilities, interests, and needs, students are sometimes advised, and sometimes wish, to elect courses in other colleges as a part of their work in the General College. Ordinarily such a combination program is possible only after a satisfactory first quarter of work in this college. In some instances such courses contribute to preparation for the degree of associate in arts, but where they do not, students must expect to devote a longer time than six quarters to the General College. Again, in conference with your adviser, you will be counseled in terms of your aims and needs.

4. **Military and Naval Reserve training.**—The course in Military Science and Tactics, culminating in a reserve officer's commission in the United States Army, and the course under the Navy Department, are examples of a possible combination as discussed in the paragraph above. Your attention is called to these courses (pp. 56-62). They do not substitute for the required physical education courses.

### DETAILS OF REGISTRATION

1. Bring this Bulletin of the General College with you.

2. If you are registering at the University for the first time, bring your *admission certificate* together with the *Recorder's Form Letter (A109)* that accompanied it, or your record of advanced standing. If you have been enrolled before at the University bring your *blueprint record*.

3. *Have ready a list of the comprehensive areas and courses in them that you have decided you want* after having carefully studied this Bulletin of the General College. This list will be the basis for your conference with an adviser and should include the names of the courses and the hours and days the courses meet. Previous to program advising in Freshman Week, specific procedures for fall quarter registration will be explained to small groups of students. The time for this is listed on your Freshman Week card. Appear promptly at this time and no other. For registration other quarters, students entering the college for the first time will come directly to Westbrook Hall, the General College Building. An information blank to be filled out by the student will also be given out at this time. When you and your adviser have finally decided what your program is to be, you will copy it carefully on the registration blank. Be sure to keep a copy of this program; add to your copy the location of each class by building and room number. This information can be obtained from your adviser when you register, or from the bulletin boards in Westbrook Hall. Registration time and procedures for students previously enrolled in the college will be announced in the Official Daily Bulletin.

4. **Tallying.**—Before you take your program to the University Armory to obtain your fee statement, you must have your program checked against class lists. A clerk will do this and stamp your program "tallied." The information blank completely filled out is to be turned in at this time. No program will be accepted at the Armory unless it has been so stamped.

5. **A basic diagnostic testing program** has been set up for all students entering the General College. This will be given in the fall quarter during Freshman Week and the week following; for other quarters, at a time specially set aside for it. Registration in the General College is incomplete until this testing has been completed. During Freshman Week these tests will be given at the time and place indicated on your Freshman Week program card. The time and place for tests after school has opened will be announced in your classes and on the bulletin boards in Westbrook Hall. Plan to take the tests at the scheduled time.

6. **Miscellaneous questionnaires and blanks.**—The booklet of instructions for Freshman Week will tell you where you are to be at certain times; follow these directions carefully. You will be told, further, where to hand in various cards and questionnaires. Fill these out according to the directions and be sure to leave them at the proper places.

7. **Fee statements.**—When you present your tallied program at the University Armory you will be given a fee statement. Pay fees on or before the last date on the fee statement. You will save yourself much time and tediousness of waiting in line if you pay these by mail. Be sure to retain the receipt (placed in your post-office box in Coffman Memorial Union, if you pay by mail) for presentation to your course instructors on their request.

8. **Course registration.**—The last step in the registration procedure is that of appearing in class at the first meeting of each course and enrolling your name with the instructor as he directs. It is important that you leave your name, for the class rolls are obtained only in this way. Unless your name is on the official class roll you will receive no credit for the course.

#### ADDITIONAL ADMINISTRATIVE REGULATIONS

**Adding or canceling courses.**—Adding new courses to your program is permitted during the first two weeks of each quarter only by permission of your adviser. Courses may be canceled at any time under certain conditions. To add

or cancel a course during the first two weeks discuss the changes desired with the adviser who helped you plan your program and he will sign a cancel-add slip for you if the changes are approved. Canceling a course after this period must be done through the administrative office. Dropping out of a class does not constitute an official cancellation. Students dropping out without following through to an official cancellation may expect to get an F in the course. Any student who cancels when his work is below passing will receive a grade of "Cancel F."

**Examinations.**—Since examinations are the chief means by which the college and the student himself can judge his performance and progress, much work has been and is being done to develop fair and complete tests. The student is therefore obligated both to himself and to the college to prepare adequately for these examinations and to take them at the regular time announced by instructors.

Make-up examinations will be given on the third Saturday of each quarter unless that day or the preceding day is a holiday. No student may take any make-up examination without official permission or a Health Service excuse. A \$5 fee will be charged for examinations if they are not taken on the first make-up day.

**Auditors.**—Students from other colleges, who have the permission of their college, and adult auditors are welcome to take one or more courses in this college, the accrediting of the courses for the former resting with the college in which they take their specialized work. Auditors are charged the same fees as students regularly registered.

**Grades.**—Letter grades A, B, C, D, E, F, or I, and percentiles for individual courses will be sent to each student at the end of each quarter. A grade of E is a condition grade and means a poor quality of work, perhaps explained by illness or other emergency. An E grade must be removed by the next make-up examination date or it becomes an F. A grade of I will be given only when the student has failed to take an examination, the make-up for which is not possible within that quarter, the failure to take the examination presumably being explained by illness. The penalty for failure to hand in special papers, term reports, and other assignments is in the hands of each instructor. Failure to meet these assignments may result in a grade of 0 for that portion of the course work, thus lowering correspondingly the final grade for that quarter, or it may result in a condition (E) for the course.

In those few instances when a student seems to have a legitimate reason for asking further time for preparing reports, papers, or for the final examination, arrangements should be made in writing with the instructor in advance of the examination period. This written permission slip should be filed in the office of the assistant director at the time it is secured. Failure to follow this procedure may result in loss of credit for that portion of the course work, thus lowering the final grade. If all uncompleted work is not completed by the make-up day in the following quarter, grades of E and I may become F. An F grade is to be removed, or a grade raised, ordinarily only by a retake of the course (see re-examinations and fees, page 20).

**Combination programs.**—Courses in other colleges and departments of the University are open to General College students under the following conditions only. All requests for such courses must be cleared with the college counselors by the date published in the Official Daily Bulletin. No requests will be approved after this date. All requests must be approved by the counselors of the General College and the proper officer of the college in which the course is given. Approval of such courses is granted to: (a) students who have in high school demonstrated special interest and ability in a field in which the General College does not have

courses, such as Latin, engineering drawing, music techniques; (b) students who in the general courses in this college have found an interest and demonstrated an apparent ability which properly leads them to try out specialized courses in the field. Thus, a girl who has had a successful year in the General College art or eutenics courses may be ready to try specialized work in art education or home economics. A boy who has had a year of general economics studies may be ready to apply for approval of a tryout in elementary accounting or statistics. *Approval will not be granted until by demonstration of work already accomplished in high school or in the General College the student shows himself ready for a tryout course.*

**Transfer to other colleges.**—General College students may transfer to other colleges of the University *after a period of successful achievement* in this college. This period must be long enough (a full year or two full years) to give to the officers of this college and of the receiving college evidence of the student's real ability, keen interest, and serious purpose in the specialized field of his choice. A high level of work in this college, the demonstration of a mature attitude, together with test, clinical, and counseling evidence that the student will profit by professional training are required by the assistant director in order to obtain his recommendation for transfer. He looks upon such a recommendation as a statement of his faith that the student can meet the stiff competition in professional training, a faith that must be founded on as full evidence as can be had.

The University does not bar the way to any student who, in the General College or any other college, gives a demonstration in his class work and examinations of hard-hitting, interested, and competent studentship. With a good record, transfer into specialized professional work is not difficult. Without such a record, it would be unwise for the student to attempt it. The General College counselors will make clear to anyone who asks what constitutes a record warranting transfer to other divisions of the University.

Students must file application for transfer to another college at the recorder's office and in the General College office on or before the dates specified in the Official Daily Bulletin and on the college bulletin boards.

**Transfer from other colleges.**—Students in other colleges who wish to transfer to the General College may file application for transfer at the recorder's office and in the office of the college in which they are registered, on or before the dates specified. Upon recommendation of the dean of the college in which they are registered, such students will be interviewed by staff members of the General College, by appointment; and their applications will be accepted or rejected by the officers of the General College. Work successfully completed in other colleges may contribute to comprehensive areas in this college. Students may petition for evaluation of their work for this purpose at the end of a quarter of successful achievement in this college. Previous work in some few instances may be sufficient in scope and amount to be an acceptable substitute for a comprehensive area. In general, however, such work will be evaluated in terms of the comprehensive areas of this college and students advised as to the additional courses to be taken as preparation for specific comprehensive examinations.

### COMPREHENSIVE EXAMINATIONS

**Scope.**—The General College comprehensive examinations cover course work in four different orientation areas: individual; home life; social-civic; and vocational; and in five general areas: biological science; general arts; human development; literature, speech, and writing; and physical sciences.

Provision is also made for additional areas of study involving special interests when these are desirable in meeting the needs and interests of the individual student.

The comprehensive examinations are designed to cut across course lines in order to correlate all course work—reading and studying—into one complete whole. Everything learned or read in the field will be of value in meeting examinations. These examinations require that education be continuous, that work be self-propelled in all lines, that the interrelationships between knowledge be developed, and that experience be meaningful and of value.

Before planning their programs, all students should study carefully the orientation areas. These courses are specially designed to meet the needs of young people in a modern world. Because they sound different from the usual titles of courses some students think they will have none of them. This would be a serious mistake. Each of the orientation areas consists of a required core. Additional electives may be selected to provide adequate preparation for a comprehensive examination. The total course hours within an area, including those in the core, should average about fifteen hours with a minimum of twelve hours passing work.

Work is to be planned with comprehensives in mind. A great deal of flexibility in meeting individual needs and interests is provided within the areas. It is important that every student plan his or her program in such a way as to make adequate preparation. Whenever preparation is complete, the examinations may be taken. It is neither necessary nor required that a student take all courses in a group in order to take a comprehensive examination in that field. Special examination days will be arranged during each quarter. If you fall in the low score brackets on a comprehensive examination, it simply means that your preparation is incomplete and the examination may be taken again after more course work or study in that field and on payment of a fee for the additional examination.

While comprehensives are one of the means the college has of measuring progress in achieving its purpose, students should keep in mind that single courses may always be elected as "luxury" courses. A comprehensive program may be planned with both breadth and depth and still leave time for limited experience in a number of other areas through single courses.

**Time.**—The comprehensive examinations are set for the close of the spring quarter, at which time most students will have completed their course work in a sufficient number of areas. Since it is the policy of the General College to allow students to take examinations whenever they are prepared to meet them, one examination day will be announced near the close of the fall and winter quarters at which time students will be allowed to take a comprehensive examination if they are prepared.

**Requirements.**—All students are required to complete comprehensive examinations for the degree of associate in arts. These may be selected from any of the areas (page 20).

A student enrolled for a full program should expect to prepare himself for, and take, comprehensive examinations each year. One enrolled for part time or doing a good deal of outside work, except under unusual circumstances, should center his attention on fewer areas, expecting then to take a longer time to complete the work for a degree. All students in the General College for one year must take comprehensive examinations if they are planning to continue in the General College, to transfer to another college, or to work for the associate in arts degree. For those who wish to transfer, the comprehensives give strong evidence for granting or withholding recommendation.

**Re-examinations and fees.**—In rare instances, upon evidence of additional course preparation, and with approval of the proper authorities, course or comprehensive examinations may be retaken on the scheduled examination date. A fee of \$5 for retaking an examination is charged, except in those instances in which a student is entitled to an additional comprehensive because of length of residence in the college.

One comprehensive examination is allowed for each quarter in residence in the General College. Extra comprehensive examinations require the payment of a \$5 fee. Make up of an E grade requires the payment of a \$1 fee.

**Eligibility.**—The conference regulations regarding eligibility of General College students for intercollegiate athletics state, among other requirements, that students must complete one half of the work for the degree of associate in arts with a suitable average to be eligible to compete during the sophomore year.

### COMPREHENSIVE AREAS\* AND COURSES

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|---|--|
| <p>1. Individual Orientation (pp. 23-24)<br/>Individual Orientation core and 8 to 12 additional hours<br/>Human Biology<br/>Human Development<br/>Psychology, or miscellaneous courses or experiences selected for the individual student</p> | <p>Mathematics of Business<br/>Physical Science<br/>Psychology<br/>Euthenics</p>   |
| <p>2. Home Life Orientation (pp. 24-25)<br/>Home Life Orientation core and 7 to 12 additional hours selected from<br/>Euthenics<br/>Human Biology<br/>Consumer Relations of Physical Science<br/>Sociology of the Family</p>                  | <p>5. Biological Sciences (pp. 28-30)<br/>Human Biology<br/>Basic Wealth</p>   |
| <p>3. Social-Civic Orientation (pp. 25-26)<br/>Either Contemporary Society or Current History as core and 6 to 12 additional hours from social science courses</p>  | <p>6. General Arts (pp. 32-35)<br/>One quarter General Arts course and 9 or more additional hours<br/>General Arts<br/>Music Today<br/>Film and Drama<br/>Literature Today</p> |
| <p>4. Vocational Orientation (pp. 26-27)<br/>Vocational Orientation core and 7 to 12 additional hours selected from<br/>Vocational Orientation Laboratory<br/>Art Today<br/>Our Economic Life<br/>Human Biology</p>                           | <p>7. Human Development Studies (p. 35)<br/>Human Biology<br/>Human Development and Personal Adjustment</p>  |
|   | <p>8. Literature, Speech, and Writing Studies (pp. 35-38)<br/>Literature Today and one or both<br/>Oral Communication<br/>Writing Laboratory</p>                               |
|   | <p>9. Physical Science Studies (pp. 38-40)<br/>Physical Science</p>  |

For more specific requirements concerning planning for comprehensive examinations see pp. 64-65.

\* A comprehensive area usually represents 12 to 18 quarter hours of course work and is made up of one or more basic courses with additional electives selected under guidance.



## A LIFE-CENTERED CURRICULUM

For the past nine years the General College has been asking its students what they really need in general education. A great many of the eight thousand students who have been in the college during these years have helped us to see these needs more clearly. A representative group of one hundred General College students and their families have given even more generously of their time and thinking during the past few years to provide information helpful in building a curriculum. Four years ago, we asked sixteen hundred former students of the University of Minnesota—young adults who had had one or more years of study here, some entering in 1924-25, others in 1928-29—to tell us how life looks to them today. As a result of these and other findings we are constantly rebuilding the curriculum in this college. The first significant changes are the introduction of certain core courses, dealing with basic relationships of life, with which we have now had three years' experience.

The first of these four basic needed areas of general education, our students tell us, is for vocational orientation. Not only in the studies made by the General College but in other explorations of the needs of youth, including that of thirteen thousand young people in the state of Maryland and a good many more thousands in New York state, Chicago, Detroit, and Oakland, we learn that young people want to find out what job to do. They are troubled by unemployment and uncertainty; they are confused by the tremendous number of jobs of all kinds and varieties; they are bewildered by many pressures, such as the success stories in the newspapers, magazines, and movies, and by families who want them to do one thing while they want to do another. We are building, therefore, a core course in vocational orientation to spread before the General College students the variety of the work of the world, the real dignity and worth of all socially useful work, the way in which all kinds of jobs are related to one another, and how students can learn most wisely and well what particular broad area of work they would be most successful in or most likely to fail in. For this course we draw together information from many sources—from the census, from youth studies, from employment offices, from experts in various occupations, and particularly from the university resources, such as the University Testing Bureau and the college counseling service.

But men and women are not just job holders, not plow horses or pack animals. Outside the job, they have other important ways of life. One of these is found throughout all the span from birth to death in an individual's relations in his home and with his family. As a baby he is cared for by parents; as a youngster he lives with them, with brothers and sisters and grandparents; as a college student he has adjustments to make with his family; and shortly after college he begins establishing a family of his own. Always, whether he be married or not, he has a home of some sort. Some people are inclined to think that home and family life can be taken for granted; that we do not need training for marriage or for maintaining a home or for rearing children; but our students of the past and present tell us that this is not so. On the contrary, the divorce rate is rising; marriages have much more chance of going on the rocks than they did just a few years ago. Homes, they find, can be desperately unhappy or grand places in which to live, depending upon the training and care that goes into us who make them. Therefore, we are building a course in home and family living to satisfy this need.

In a dictatorship we would have no need or right to give the third of these core courses, since all education under fascism or nazism or communism is directed at making the individual young man or woman realize that he is unimportant and that the state is everything. In a democracy, however, it is essential that we learn as soon as we are able that we are not merely work animals nor just members of a family, but that we have also membership in a larger group, in our neighborhood, community, village, town, city, state, and nation. It means that individual well-being and group welfare are inseparably bound together and that we must work together as members of the larger society to improve our economic, political, and social situation. In order that we may learn what are our responsibilities in the larger society of America, it is essential that we study the functions and structures, and the meanings of our society. Therefore, we are building on the demand of our students, a third core course in orientation to social, political, and economic responsibility.

Aside from our work life, our home life, and our social and civic life, each of us has an individual life of his own. We build a philosophy, an inner way of looking at things, through participation in sports and games, through reading, art, and music, through understanding our bodies and their drives and hungers, and through insights into the minds and emotions of those we love or hate, of those with whom we work or play. Our students ask us, therefore, to develop a fourth core course which will deal directly with these matters and will help the students of the future to pool their experiences, pleasant and unpleasant, of all kinds, into a pattern that will give life real meaning and value.

## DESCRIPTION OF COURSES

### INDIVIDUAL ORIENTATION

*The basic course in the Individual Orientation area is a four-hour, one-quarter course offered during each quarter of the year. Each student who wishes to take a comprehensive examination in this area is required to take this course. In addition, each student, according to his needs and interests, should elect, with the assistance of his program adviser, a minimum of eight hours in courses which will contribute to his individual orientation. One student's needs may point to courses which will aid him in understanding himself and others, while another student's needs may call for experiences in acquiring social skills or in creative expression. Individual Orientation 2A is an elective two-hour course of the latter type.*

*Those courses which have greatest value for most students in extending their understanding of themselves and others are Psychology, Human Development and Personal Adjustment, and Human Biology. Many others have individual orientation value for one student and not for another. Program planning in this area should be an individual matter.*

Students entering the fall quarter who plan to take the Individual Orientation comprehensive examination at the end of the school year should register in the basic course in the fall or winter quarter.

The Individual Orientation core course has three purposes: to help the student understand himself and other people; to help him enjoy life more fully; and to help him develop and criticize his attitudes toward life and its problems. The attainment of these ends requires that each student spend some time in thinking, talking, reading, and writing about such problems, in class and in individual conferences with the instructor and members of the staff. Each student is required to have one conference with the instructor during the quarter he is taking the basic course. As the student finds in himself strengths to be developed, or weaknesses to be overcome, in relation to his own personal effectiveness and happiness, he may wish to undertake a specially planned program designed to increase his orientation.

G.C.1Af,w,s—Fall, winter, and spring quarters. INDIVIDUAL ORIENTATION CORE.  
Required for Individual Orientation comprehensive.

In this basic course an attempt is made to provide a basis of self-understanding through consideration of such topics as: the nature of personality; the effect of heredity and environment; the effect of the physical condition on personality; the nature of intelligence; the nature of emotions; and sex and reproduction. Since each individual must not only understand himself, but other people, attention will be given the normal development of social behavior, with some concern for the common abnormalities of behavior. Ways to improve relationships with other people are suggested.

Throughout the quarter attention is drawn to those attitudes which make up the individual's philosophy of life and which determine, to such a great extent, the conduct of men. Students are encouraged to examine their beliefs in regard to important ethical problems, to discover inconsistencies in their behavior under various circumstances, and to develop the foundation for a satisfactory philosophy

of life. The purpose of this consideration is to stimulate thinking about values in life, not to impose any one system of beliefs nor to break down any ethical principles already accepted. Enrolment limited to 50 students. 4 credits. Mr. Dean.

G.C.2Aw,s—Winter and spring quarters. INDIVIDUAL ORIENTATION.

This course deals primarily with social adjustment. It considers common problems of social adjustment and the development of social skills. The method is mainly a laboratory method supplemented by class discussions and lectures. Since, in a society providing an abundance of leisure, a wide variety of interests is essential to personal happiness and to social adjustment, opportunity is provided the student to survey the values of many activities of all sorts provided by the University, and to choose for himself participation in those activities which are most valuable and interesting to him. Individual Orientation 1A is a prerequisite for this course. Enrolment limited to 40 students. 2 credits. Mr. Dean.

### HOME LIFE ORIENTATION

*This course is the core of the Home Life Orientation area. It is required of each student who wishes to take a comprehensive in the area unless excused by the co-ordinator in the area. In addition, each student, according to his needs and interests, should elect, with the assistance of a program adviser, a minimum of seven hours from other courses contributing to the area.*

*Those of most general value for this purpose are Euthenics courses, Human Biology, Consumer Relations of Physical Science, and Sociology of the Family.*

Home and home life have been taken more or less for granted by many people. That small children need the protection of the home has been rather generally recognized. That home life is an important factor in individual satisfaction, in job success, and in social responsibility throughout life has been less generally understood. All youth studies of the past few years point to the desire of young people not only to establish homes but to make home life successful and satisfying, to do a better job of homemaking and home living than have their elders. In two recent studies made in this college, "happy married life" was checked most frequently by young adults and adolescents as the life satisfaction most desired. For these reasons, among others, special courses dealing with problems of home living have been developed.

G.C.3Af,w,s—Fall, winter, and spring quarters. HOME LIFE ORIENTATION core. Required for Home Life Orientation comprehensive.

This core course deals with certain basic questions in regard to homes and home life. Early in the course emphasis is placed on the particular values of family life to the individual and to our economic society, determining to each student's satisfaction the necessity of preserving and strengthening monogamous family life. The college student is usually still a member of his parent's family, and is also thinking of family life for the future. Problems in being friends with his family and developing friendships outside the home are discussed. Factors which make for success or failure in marriage are considered in relation to the problem of selection of a mate as well as adjustment later. A number of various forms and patterns of premarital relations are discussed in relation to personality development and future family happiness. How changing social and

economic conditions have modified the needs, functions, and activities of the family; the services offered to the family by society; and control over the family by society are important in promoting good family relationships. The place of the child in the home, the importance of the influence of the home in the development of the child, and responsibilities of both parents in rearing children are important. The latter part of the course is concerned with the relationship of the job and home life; ways in which life within the home affects the job; family pressure for jobs having prestige or more money; sickness or worry about money and the job; ways in which the job affects the home—hours of work, leisure time, place of living, social status; ways in which life off the job should supplement it; special family problems when married women work outside the home. Enrolment limited to 90 students. 5 credits. Miss Holmstrom.

### SOCIAL-CIVIC ORIENTATION

*Two orientation courses, each comprising a total of six hours during the year, are available in the Social-Civic Orientation area. Only one is to be taken as a core in preparing for the comprehensive examination in the area. In addition to this, each student, according to his needs and interests, should elect, with the assistance of a program adviser, a minimum of six hours from the social science studies.*

CONTEMPORARY SOCIETY. Social-Civic Orientation core course.

In Contemporary Society, attention centers on finding out whether there is a discernible pattern to the world today—a world torn by war and rumors of war, a world in which totalitarianism challenges democracy, and in which even the most optimistic person views the probable future with anxiety. To this end, in this course we probe deeply into underlying causes where necessary, search out results, and analyze significant factors in our social order. The point of departure is the contemporary American scene. Always an attempt is made to see how people as individuals fit into the picture, how what they do or fail to do contributes to the total social scene, what significant issues and problems exist, and the ways individuals can meet them.

G.C.5Af,w—Fall and winter quarters. CONTEMPORARY SOCIETY.

This course begins with a brief study of the American people and the country in which they live—that is of our human and natural resources. The major portion of the quarter is devoted to an analysis of the democratic way of life as contrasted with totalitarianism. To assist in clarifying this analysis, American democratic society is compared with that under the European dictatorships, with emphasis on the daily lives of the people. The quarter's study concludes with a study of problems of war and peace. Here attention centers on the causes of war as evident in World War I and World War II, the costs of war, the costs of peace, and alternatives to war in the world today. 3 credits. Miss Ylvisaker.

G.C.5Bw,s—Winter and spring quarters. CONTEMPORARY SOCIETY.

The second quarter of Contemporary Society is devoted to a more detailed study of the American scene, with emphasis on economic and social aspects. Because of the present concern for building up a democratic defense, special attention is given to the contributions of business and labor, to the defense program, as well as to the impact of that program on industry, education, the press, and on other social agencies. Background material is not neglected. Accordingly, a study

is made of the organization of American business enterprise with emphasis on the significance of large-scale enterprise, mass production, technological advance, and labor organizations in our society. Important social agencies, activities, and problems are also considered. Throughout, an effort is made to assess the strengths and weaknesses of democratic America as a going concern. 3 credits. Miss Ylvisaker.

G.C.6A-6B-6C—Fall, winter, and spring quarters. CURRENT HISTORY. Social-Civic Orientation core course.

A student of today is confronted and often confounded by the ever changing scenes in a superdrama of world politics, social and economic change, scientific advancement, and startling new developments in the arts. If he is to function properly as a citizen of the world he must realize himself a part of that drama, must follow it, interpret it. Above all, he must learn to relate today's significant happenings to the introduction provided by the events of yesterday.

Current History, as one of the two core courses in the social-civic area, endeavors, by relating in detail the important news of the day, by interpreting it in the light of much that has gone before, and by keeping the broad outlines of the whole picture always before the student, to encourage and assist the student to play an intelligent role in the society of which he finds himself a part. While the news—foreign, governmental, political, economic, social—is the course's point of departure, much stress is placed on background material. *Time* magazine is the text, with the *New York Times*, *Current History*, and the whole field of contemporary journalism providing reference material. Pertinent motion pictures on problems of the day are used whenever they may help to highlight and clarify material being considered in class. Enrolment limited to 200 students. 2 credits per quarter. Mr. Wilson.

### VOCATIONAL ORIENTATION

*These two courses, comprising a total of eight hours during the year, are the core in Vocational Orientation. Each student expecting to take a comprehensive examination in this area should take the first course, electing the second when this seems desirable. In addition, each student, according to his needs and interests, should elect, with the assistance of a program adviser, a minimum of seven hours of other course work which will contribute to his vocational orientation. Courses may have value for vocational orientation for one student and not for another.*

*Among those of most general value for students are: Art Today; Economic Life; Euthenics; Human Biology; Mathematics of Business; Physical Science; and Psychology.*

G.C.8Af,w,s—Fall, winter, and spring quarters. VOCATIONAL ORIENTATION core. Required for Vocational Orientation comprehensive: Choice of an Occupation and the World of Work.

This course has as its goal an individual understanding of what goes into a job choice and the methods of discovering whether or not a proper and possible choice has been made. Students are urged to use the resources of the General College and University to check in every way their job choice and what it is based on. Faculty advisers, counselors, instructors, the Testing Bureau, and the Health

Service all have information which applies to the individual and his choice. Faculty and nonfaculty speakers are employed to present special phases of the job choice problem. Moving pictures are used to present other materials. Written assignments force the student to consider his plans carefully in order to confirm present plans or discover a better path. Highlights of subject matter are: the college-student contract; personality—habits, attitudes, aptitudes, interests, and abilities, and choice of an occupation; problems in making a vocational choice; methods of choosing a vocation; the costs of a wrong choice; broad job fields from which to choose; how to get jobs; the employer and his viewpoint; the worker and his viewpoint; what's in a job; job satisfaction; accidents and diseases found on the job.

The theme of the second half of this course is concerned with jobs which men and women do in earning a living. Discussion of the material in this course is built around jobs but not job labels. Emphasis is placed upon human abilities and how they can be used to give service to others or to produce goods. Jobs are classified in terms of the kind of people who can do them.

Speakers present special fields and their possibilities. Films are used to demonstrate various interesting jobs which could not be seen by group visits. Class discussions are used to develop student contributions to the information collected. Lectures are fitted to the broad fields of human work. Reading lists provide a chance to study particular interests. Highlights of the course: jobs in language—author, lawyer, minister, editor; jobs in business mechanics—bookkeeper, credit worker, purchasing clerk; mechanical jobs—engineer, architect, inventor, tool maker; jobs with hands—surgeon, dentist, sculptor, mechanic; jobs with people—politician, teacher, personnel worker, salesman. Enrolment limited to 200. 5 credits. Mr. Brayfield.

G.C.9Aw,s—Winter and spring quarters. VOCATIONAL ORIENTATION Laboratory.

The Vocational Laboratory is limited to thirty-five students in a section. The purpose of this course is to provide experiences in making a job application, interviewing employers, collecting information about opportunities in the Twin Cities and other places in Minnesota, and acting as a committee member in preparing this information for the laboratory report.

Students must have a job choice which has been confirmed in many ways if they wish to get the most from this course. Students are required to do a number of jobs, to do them well and on time. Only those students who wish to make an intensive study of a field of work are encouraged to register for laboratory. Highlights of the laboratory course are: a searching investigation of, and well-written report on, a specific job; analysis of newspaper advertisements; investigation of training opportunities which claim to fit people for jobs; an application for a job to a strange employment manager; an investigation of how people found the jobs they work at; collection of information about jobs one may be interested in.

When a student has completed this area he should be better fitted to choose a job which he can do and be happy in; to have enough information about jobs to select wisely a small part of a broad field and know how to apply the knowledge locally; to write a good letter of application and follow it up with a well-conducted interview; to find a job efficiently; and to understand values aside from wages or salary which can be found in a well-chosen occupation. Enrolment limited to 35. 3 credits. Mr. Brayfield.

## BIOLOGICAL SCIENCES

*Human Biology and Basic Wealth may be elected as preparation for a Biological Science comprehensive. Human Biology may be elected with Human Development and Personal Adjustment (p. 42) as preparation for a Human Development comprehensive.*

## HUMAN BIOLOGY.

Biology, because of its nature and its close association with man in so many phases of his everyday life, is intensely interesting and broadly practical. When the study of general biology is intimately linked with man's quest for health, the subject is particularly interesting and practical. This intimate linkage, carrying through to the study of minimum essentials in human body structure, physiology, hygiene, and disease, is maintained throughout the course in Human Biology.

During the first and second quarters, the general objective of the course is to develop understanding of man as a biological animal. Human anatomy and physiology afford the focal points. The fields of general zoology and botany are utilized where they contribute particularly to understanding of man. During the third quarter attention is devoted to individual and community problems in health. Understanding man biologically is well-nigh essential to understanding such everyday problems as relate to history, sociology, psychology, economics, philosophy. Protoplasm, cell metabolism, variation, genetics, evolution of man, dieting, cancer, a sound immunization program, pregnancy, medical costs—these are among the topics considered in Human Biology. A student may enroll for any quarter altho he should have 10A before taking 10B. If only one quarter is elected, 10C is recommended because of its values pertaining to practical health education.

G.C.10A†-10Bw—Fall and winter quarters. HUMAN BIOLOGY: Human Physiology and General Biological Concepts. For description, see G.C. 10Aw-10Bs below.

G.C.10Aw†-10Bs—Winter and spring quarters. HUMAN BIOLOGY: Human Physiology and General Biological Concepts.

The anatomy and physiology of man are studied in some detail as focal points, considering general biological concepts. The course draws widely upon the various natural sciences in aiming to show man as a biological specimen in the ongoing scheme of Nature. Necessarily a foundation in understanding of energy concepts must be developed. Thereafter understanding of foods, calories, basal metabolism, photosynthesis, protoplasm, become clearer. Energy-matter relationships of inorganic materials from simple atoms to complex molecules ranging onward to a synoptic view of the great variations of the plant and animal kingdom fit into a picture of the orderly processes of the natural world. Brief attention is given the classification of living organisms.

During the first quarter of this two-quarter sequence the immediate metabolic processes, particularly of man, are considered: the digestive, respiratory, circulatory, and excretory systems. During the second quarter, emphasis is placed upon the adjusting and reproducing mechanisms in the living world: endocrine glands, the nervous system, muscular action, sex physiology, especially in relation to human reproduction. Genetics, eugenics, pregnancy, and the history of the human species are then studied briefly. How did man come to be? What natural forces influence his development and nature? What is his place in the natural world? What are his principal interrelationships with other animals and with

† A fee of \$1 is charged for 10A.



plants? Study in the area of these questions leads to a perspective view of man—a better understanding of his body, his physiology, even his thought and reaction processes. The course aims to lay a basic foundation such that science study in later years is more accessible, and to make contribution to the study of psychology and philosophy. Enrolment limited to 200 students. 3 credits per quarter. Dr. Potthoff.

G.C.10Cs—Spring quarter. HUMAN BIOLOGY: The Human Body in Health and Disease.

Insufficient for present-day needs are the old type hygiene courses which teach merely a series of rules for healthful living. Despite all other health measures, we will not reach a really high level of community and individual health unless the individual promotes community health measures and co-operates in his individual life. The community member, likewise, needs an understanding of medical costs and of newer medical service schemes. Eight lectures are devoted to community aspects of health—a number inadequate for detailed consideration but sufficient to give basic understanding.

In addition to understanding community problems vitally affecting him, the student needs knowledge concerning individual health, the nature of hazards to which he is exposed, practical preventive and control measures which will benefit him personally. Time is devoted to study of the nature of a general infectious disease process and of immunity. A practical preventive medicine program in immunizations applicable to all is discussed. Consideration is given the effects of common drugs, such as nicotine, alcohol, sleep-producers, alkalizers. Considerable attention is devoted to mental hygiene. Some time is devoted to the consideration of the various health agencies and to aids in the selection of health advisers. Enrolment limited to 200 students. 3 credits. Dr. Potthoff.

G.C.11Af—Fall quarter. BASIC WEALTH: Natural Resources—Their Economic Utilization and Conservation.

Most people recognize the sun as a source of heat and energy. They also know that the earth's form and motions result in changing seasons and in varying temperatures and humidity. Few appreciate, however, the effect of temperature, continental climates, and oceans upon the civilization of the human race and upon plant and animal life. To illustrate these and other important natural phenomena is in part the aim in giving this course. Natural resources upon the surface and within the earth form the basis of economic welfare. These have to do with land areas and their utilization; with food production; with forests and mines; with water for power, irrigation purposes, and social needs. Will the supply of these resources be adequate for all time? How may we best conserve the great oil reserves, the iron, copper, coal, etc.? The permanence of supply will depend upon the wisdom with which our great natural resources are guarded and used. To picture our natural resources in their true perspective and to teach the principles of conservation and economic utilization is the primary function of this course. 3 credits. Mr. Kernkamp.

G.C.11Bw—Winter quarter. BASIC WEALTH II: The Economic Utilization and Conservation of Plant Life.

Nature has covered the earth's surface with plant life, upon which man depends, directly and indirectly, for his food, fuel, fibers, and many of his structural materials, drugs, and raw materials for manufacturing. He not only uses plants

grown in their natural environment, and grows others in an agriculture that is becoming ever more complex, but he even cultures some of the lower plants in factories to bring about important chemical changes and to facilitate many manufacturing processes. The plants which are capable of growing in the various soils and climates of the world very largely determine the density of the population and the mode of life of the people. What controls have we over factors affecting production, over possible disasters to production, and over the limitations imposed by climate and soils? To answer these questions and others relating to the uses man makes of plants for food, clothing, and shelter, and for agricultural and industrial purposes, and to demonstrate methods of conservation, plant protection, and improvement through scientific procedure is the purpose of this course. 3 credits. Mr. Wilcox.

G.C.11Cs—Spring quarter. BASIC WEALTH: The Economic Utilization and Conservation of Animal Life.

When did domestication of animals begin? By what processes has differentiation in form and function been brought about? What contributions did their domestication make to modes of living? To opening new land for settlement? To extending the power and culture of nations? To diversifying and intensifying the industrial activities of advanced countries? What are the present trends in animal production, and what are the fundamental causes underlying them? Shall we maintain our fish and wild animal life or shall we destroy without replacing as has been done in the past? These questions indicate the great importance of animals, fowls, fishes and kindred species, and bees in present-day civilization and industry. So intimately is the welfare of the human race associated with, and dependent upon, animal life that every citizen should be informed as to its major contributions to mankind through agriculture and other important industries. 3 credits. Mr. Peters.

### EUTHENICS

*The Euthenics courses may be elected by any student as a part of the Home Life Orientation comprehensive. For some students these courses have special value in individual and vocational orientation (pp. 23-24, 26-27). Certain of them may be elected in the General Arts comprehensive.*

*Students having a special interest in the area may elect, after completing the Home Life Orientation comprehensive, additional courses in their second year as a special interest. Any student may elect such courses as free electives.*

Euthenics is "the science and art of improving the human race by securing the best external influences and environmental conditions for the physical, mental, and moral development of the individual and for the maintenance of his health and vigor." It is a field which may be profitably studied by both men and women. The units outlined here are designed for both.

Certain units deal with maintenance aspects of home life—food, clothing, the dwelling, and the care of the sick. Others deal more directly with social and economic problems—the family as a social unit, individual development through childhood and adolescence, business relationships, income management, individual and household buying.

G.C.14As—Spring quarter. FOOD SELECTION AND PURCHASE.

This unit is concerned with the everyday problems of food selection and purchase. Individual problems of securing adequate and satisfying food on a moderate or restricted budget will receive major consideration. This will include a study of diet, normal body growth, factors which influence individual requirements, and the nutritive value of different foods. Food selection in the restaurant and the boarding house, meal planning in the home, and common marketing problems will be discussed. The effect of different methods of food preparation upon nutritional and esthetic values, good manners, and the social aspects of eating will be presented. Food fads, fallacies, faulty advertising, food and abnormal body conditions, and certain of the larger social problems involved in feeding people will receive attention. Enrolment limited to 100. 3 credits. Ar.

G.C.15Aw—Winter quarter. CLOTHING SELECTION, PURCHASE, AND CARE.

Problems involved in being suitably and well dressed as they apply to both men's and women's clothes will be the basis of the course. A study of clothes in general and in relation to oneself, the individual ensemble, the wardrobe as a whole, the cost of clothes, and the ways in which different people meet the various problems will be given consideration. The importance of applying knowledge about clothes to planning and purchasing, and the false assumption that satisfaction in clothes is only to be secured by a large expenditure of money will be emphasized. A study will be made of simple methods of fiber identification, finishing processes, and methods of construction and finish affecting the appearance and performance of fabric, and the importance of proper care of clothing based on a knowledge of essential fabric information. Attention will be given to sources of reliable information, judging the value of labels and advertising as buying aids, differences in quality of fabric or garment which may be affected by the fiber or type of yarn used, and differences in workmanship in ready-to-wear garments. Enrolment limited to 100. 4 credits. Miss Brew.

G.C.16Af—Fall quarter. SELECTING AND MAINTAINING A HOME.

The selection and care of a living place and its furnishings will be the basis of this unit. Discussion will begin with the satisfactions desired from a home, varying needs of individuals and families, major considerations in setting standards for living arrangements, and a study of house plans to meet these conditions. Attention will be given to house design—American houses today and the styles from which they are derived, the style of the house in relation to the owner and neighborhood, and standards for judging the design and color of a house. The study of furnishing the home will include utilitarian needs to be met, securing attractiveness within the home, cost of furnishing a home, and buying furniture and furnishings. Discussions of care will be concerned largely with general principles and care in relation to making decisions in regard to purchasing furniture and furnishings and in finishes for walls and woodwork. Community problems affecting comfort in living will also be considered. Enrolment limited to 100. 3 credits. Miss Vetta Goldstein.

G.C.16Bw—Winter quarter. RENTING, BUYING, OR BUILDING A HOME.

This unit is designed to present some of the problems of the individual in regard to housing. Studies will be made of the ways people reach a decision in regard to whether to rent, buy, or build, and the ways they select a neighborhood in which to live. Attention will be given through a study of house plans to suit-

ability of space and arrangement in meeting individual needs. Points to consider in renting will be presented. Problems in buying a home—examining the plan, the construction of the building, title to property, and business aspects—will be considered. Planning for construction, new developments in building, construction processes, landscaping, and community problems in housing will be studied. Enrolment limited to 100. 2 credits. Mr. Robert T. Jones.

G.C.17Af,w—Fall and winter quarters. MAINTENANCE ASPECTS OF FAMILY LIFE.

The basic problems of maintaining a family will be studied in this course. Discussion will begin with a study of family incomes today; the amount of money families have; the things for which they spend their money; factors which influence the spending of the individual family income; sources of common family financial difficulties. Management and a knowledge of and skills in housewifery enter into success in running a home. The problems involved in good management and the share of the man in running a home will be studied. Selecting a house which meets family needs, maintaining a healthful home, using leisure time to enrich individual and home life will also receive attention. Enrolment limited to 100. 3 credits. Miss Holmstrom.

G.C.17Bs—Spring quarter. INCOME MANAGEMENT, INDIVIDUAL AND HOUSEHOLD BUYING.

The financial policy of the individual and the family, needs which must be met by the money income, personal and family budgeting, and record keeping will be studied. General problems of consumer buying, characteristics of a satisfactory market from the standpoint of the buyer, advantages and disadvantages of different types of retail stores, and judging the quality of goods will be discussed. Consideration will also be given to the influence of advertising on consumer selection, the meaning and value of labels, guarantees, seals, and stamps of approval. Sources of consumer information will be evaluated. Attention will be given to problems arising from an increasingly highly organized market less intimately concerned with individual needs or connected with the individual buyer, and an increasing display of goods and brands accompanied by high pressure salesmanship and advertising. The interrelationship between family well-being and careful consumption in the home and the interdependence of family consumption and national economy will also be studied. Enrolment limited to 100. 2 credits. Miss Kafka.

Students having a special interest in home life or in euthenics will find such courses as G.C. 38A-38B, Consumer Relations of Physical Science; G.C. 42A-42B, Human Development, and Personal Adjustment; G.C. 48A, Problems of Consumption Economics; G.C. 50C, The Sociology of the Family; G.C. 56A-56B, Home Landscaping; and G.C. 57A-57B, Floriculture, and Home Gardening, of value, in addition to those listed in the euthenics area.

### GENERAL ARTS

*Each student who elects the General Arts comprehensive will take any one quarter of the core course, General Arts: 21A, 21B, or 21C. If he so desires, or if his adviser suggests it, he may take two or three quarters of General Arts, in any case receiving three credits for each quarter.*

*In addition, as preparation for this comprehensive, the student will undertake further work in Music Today, Art Today, Literature*

*Today, or Film and Drama. Other courses may be selected from the above offerings, or from Clothing Selection, Housing, Landscaping, Gardening, Creative Writing, or Speech Studio.*

G.C.21Af-21Bw-21Cs—Fall, winter, and spring quarters. GENERAL ARTS ORIENTATION.

What are the General Arts? How do they arise from our daily lives? How do they affect our understanding of any one art, such as the movies, music, painting, sculpture, literature, ballet, architecture, radio, and speech? A searching study into that area which is common to all the arts. A course designed to show the student now only interested in music, the plastic and graphic arts, the dramatic arts, or literature how his favorite art is closely related to the other arts. Enrollment limited to 100. 3 credits per quarter. Mr. Hill.

G.C.22Af-22Bw-22Cs†—Fall, winter, and spring quarters. ART TODAY.

*Students who plan to take only one quarter of Art Today are advised to register for G.C.22A. Both the other courses depend upon the work in the preceding course or courses, and students entering in later quarters may find themselves handicapped if they do not have the first quarter's information.*

Many of us associate the word art with Sunday afternoon visits to museums and galleries, yet art is actually an integral part of our daily lives. When we consider what clothes to wear, how to arrange the furniture in our home, what movies to see, even what magazines to buy, we draw on our knowledge of color, form, and design to help us decide. Often we could make more satisfying choices if we had a better understanding of the basic principles of art. This course aims to promote such an understanding through a study of the materials and methods used by modern artists in many fields—architecture, industrial art, commercial design, as well as painting, sculpture, and the graphic processes. While emphasis is laid on contemporary art forms, present trends are discussed in their relation to the great art of the past. Thus we may perceive how artists have always communicated their ideas and feelings, often saying more in one painting or one piece of sculpture than a writer can say in a thousand pages.

The course work consists of illustrated lectures, discussions, laboratory work, and field trips. Students may enroll for one, two, or three quarters. No special abilities are required. 3 credits per quarter. Miss Fisher.

G.C.23Af-23Bw-23Cs†—Fall, winter, and spring quarters. ART LABORATORY.

The work in the Art Laboratory aims, by giving students actual experience in art production, to cover the same materials presented in the Art Today course. The problems in the laboratory are individual and may be selected according to the student's own needs and interests. Some students may, for example, elect to work throughout the quarter on one project such as house design or clay modeling. Others may find it to their advantage to experiment with a variety of projects. Supplies and equipment are available for a wide range of problems. Readings, lectures, field trips, and discussions develop from the problems met in the laboratory. No special skills necessary. Each section is limited to 30. 3 credits per quarter. Miss Fisher.

*General College Recreational Art Laboratory.*—The Art Laboratory of the General College will be open to all university students afternoons and evenings. This is an informal workshop with no assignments and no time limits, where anyone may come to work on art problems

† A fee of \$1.50 per quarter is charged for this course.

of his own choosing. Students may frame pictures, build bookshelves, make costume jewelry, shape copper and pewter dishes, weave belts and table mats, bind books, make etchings, print linoleum blocks, make silk screen prints, paint, and draw. Tools and equipment for these and many other projects are available without charge. The workshop is under the supervision of the General College art instructional staff.

G.C.24Af-24Bw-24Cs‡—Fall, winter, and spring quarters. MUSIC TODAY.

Music Today is an inquiry into the drive that lies behind music and attempts to establish a basic reason for the need of music. To this end, there is a close study of the elements out of which music is made: rhythm, melody, harmony, and tone color. To this end, also, there is an investigation of the problems of organization which takes the student across the entire field of musical activity. The examples are drawn chiefly from local concerts and important radio broadcasts. *No special ability or previous musical knowledge is required for Music Today.* Students may enter any quarter. Each section limited to 60. 3 credits per quarter. Mr. Hill and assistants.

G.C.25Af-25Bw-25Cs‡—Fall, winter, and spring quarters. FILM AND DRAMA.  
(25A not offered 1941-42)

Eighty million people go weekly to the movies. Many million visit playhouses for other types of theatrical entertainment. New York and the whole United States and the world in general give audience to the theater in its various vital forms. Yet the movies are by far the greatest type of mass entertainment the world has ever known, and it is high time we consider them in relation to the current world, in relation to the theater in general, to drama in particular, and to the people who see them. Today they are the most easily available and the most typical form of dramatic art.

Film and Drama approaches the theater problem from the point of view of the film audience, realizing the extent of strong social and personal influences upon this vast movie audience, in the belief that more aware, more responsible, more appreciative, and consequently more demanding audiences can and should be developed.

Film and Drama is a course in the appreciation of the film, with constant reference to other theatrical forms, especially drama. Merely to discuss these matters in terms of random viewing of films shown in local movie houses is not enough; Film and Drama, consequently, builds around (1) a series of film projections, and (2) discussion before, during, and after these showings. When important plays appear on the campus or in one of the Twin City theaters, those performances are discussed; when allied forms of ballet, opera, etc., are performed, they, likewise, are introduced in discussion. The point of view is always the theater as a whole, with the film as the focus.

The fall quarter introduces the film and the play revealing life as it is. Lectures and discussions on the realistic approach to the narrative form bring out such factors as: the emotional response to the film or play, pictorial design as worked out on the stage and on the screen, and the importance of sound directorial techniques in both media. Films and plays seen this quarter are definitely contemporary. Besides the fictional film with the realistic background, the documentary film occupies part of the lectures and discussions. Other types of film seen this quarter are comedies, those with literary backgrounds, and films with sociological implications.

The winter quarter introduces the film and the play revealing unusual forms

‡ A fee of \$1.50 per quarter is charged for this course.

of life. The films seen this quarter are of three main types: cartoons, mystery films, and musicals. These experimental forms of the film are supplemented by plays of a fantastic nature.

The spring quarter introduces the film and the play revealing life in the past. This quarter's work takes up the development of film making and the use of the motion picture as a means of presenting history. Using the sources of the Museum of Modern Art, several old pictures, both silent and sound, are shown. This leads to discussions and lecture-demonstrations on modern technical methods used in motion picture production. During the quarter plays seen are of a classical type.

Throughout the three quarters questions arise: What, in general, are the sources of pleasure in the theater? Is the theater building a good one for its purpose? What are the roles of actor, designer, playwright, scenarist, producer? How does the theater consider the concepts of realism and artifice? What roles do life and escape from life play in the theater? And last and most important, how and to what extent do theatrical entertainments draw upon contemporary economics, sociology, and psychology for their materials and methods? 2 credits per quarter. Mr. Hamilton.

#### HUMAN DEVELOPMENT

*G.C.10A-B-C, Human Biology, and G.C.42A-B, Human Development and Personal Adjustment, may be combined into a Human Development comprehensive. (See pages 28-29 and 42 for course descriptions.)*

#### LITERATURE, SPEECH, AND WRITING STUDIES

*A comprehensive area made up of Literature Today, Writing Laboratory, and Oral Communication may be elected. Literature Today may also be elected in General Arts.*

G.C.29As—Spring quarter. READING SKILLS.

A course designed to improve techniques of reading. Registration only on advice of counselors. Enrolment limited to 40 students. Mr. Appel.

#### LITERATURE TODAY

Literature Today, as the title suggests, will use modern writings for study in the course. The point of view is that of examining these writings for a reflection of the ideas, institutions, and customs which make up modern civilization. Such an examination should contribute greatly to the student's understanding of the life around him. Many of our present-day ideas and institutions can be understood by studying them directly; some, however, can be best understood by examining the forms from which they grew. The course, therefore, studies older literature whenever understanding and appreciation of today's literature depend in a great measure upon the older, tho such a study is not chronological but comparative.

Little attention is paid to developing speed in reading; rather the emphasis is placed upon reading fully with great comprehension. Thoughtful, reflective reading reveals to the student how short stories, plays, essays, novels, and biographies are used to spread propaganda for communism, socialism, capitalism, fascism, and so forth. The course, then, should stimulate the student to read

wisely and objectively so that he may find his own answers to problems presented in the literature of today, and not merely conform, sheeplike, to spectacular, but changing, tendencies of thought which he finds surrounding him.

But the course has a further aim; it seeks to stimulate the student to express his own experiences to his better understanding of them and to awaken in him a greater, more pleasurable appreciation of literature so as to furnish a source of never ending intellectual enjoyment and growth.

G.C.30Af,w—Fall and winter quarters. LITERATURE TODAY.

The emphasis in Literature Today, Course 30A, is more upon the problems of reading confronting all of us whether we read road maps, telephone directories, catalogs, or reference books for information, or whether we read stories, poems, plays, or novels for pleasure or for widening our experiences. Special attention is paid to the theme that literature is an interpretation of life. The materials of the course have been chosen because of their special appeal to students and because of their pertinency to contemporary living. The lectures by the instructor and the reports by students center in methods of comprehending intelligently and pleasurably what is studied. 3 credits. Mr. Appel.

G.C.30Bf,w—Fall and winter quarters. LITERATURE TODAY.

Of the thousands of books published each year only a small number are deserving of serious consideration by the modern reader, but it is difficult to distinguish the good from the bad as they come streaming from the presses. In attempting to make an intelligent choice of books even for merely recreational reading one is faced with a real problem. The aim of Literature Today, Course 30B, is to give help in selecting those contemporary books which may be read with the greatest profit and pleasure. Members of the class purchase for the course books of their own choice. *No student may use a book already in his possession.* There are reports on the reading, and class discussions. The class studies together book reviews, short stories, and articles appearing in current magazines. Lectures are devoted to a consideration of the values inherent in the different types of literature, and the ideas and techniques characteristic of literature today. Limited to 150 students. 3 credits. Miss Kranhold.

G.C.30Cw,s—Winter and spring quarters. LITERATURE TODAY. (Not offered 1941-42)

The literature of any country reflects the physical and intellectual environment of the period in which that literature is created. Moreover, it is shaped, not by the authors, not by the publishers, nor yet by the college professors—but by the people of the country as they live their various lives. In this course, the student samples the literary output during the past hundred years of each section of the United States, and examines that literary output in relation to its contemporary background. In this way he will at length be able to trace the various relationships between the ordinary, everyday lives (their work, their play, their hopes, their despair) of the American people and their literature. Limited to 150 students. 3 credits.

#### WRITING LABORATORY

G.C.31A-31B-31Cf,w,s—Fall, winter, and spring quarters. WRITING LABORATORY.

Composition is taught in the Writing Laboratory from the point of view of the student's current and future needs. Individual conferences and assignments in the Writing Laboratory are augmented by general lectures and discussions



so that each student becomes acquainted with the various types of writing and with the procedures best adapted to those types. Special emphasis is placed upon understanding the functions of language as it is used today, especially in regard to current usage and standards for knowing what is acceptable in speech and writing.

Though assignments are given from time to time, each student finds frequent opportunities for writing, as a part of his work for the course, letters home, business letters, letters of application, and class notes for himself, as well as term papers, book reports, and speeches for other courses. All such writing is done in the Writing Laboratory, which is furnished with suitable chairs, desks, and reference books. Enrolment in all sections limited.

Students who have had *no* Writing Laboratory work register in sections numbered G.C.31A.

Students who have had *one quarter* of Writing Laboratory register in sections numbered G.C.31B.

Students who have had *two quarters* of Writing Laboratory register in sections numbered G.C.31C.

For sections, schedule, and rooms, see Schedule, pages 63-64. 3 credits per quarter. Mr. Appel, Miss Kranhold, Mr. Featherstone.

#### ORAL COMMUNICATION

The General College speech courses are designed to help students develop a sense of constructive insight and objective understanding with respect to what they do and how they sound when they talk. The courses might well be described as *experience laboratories* set up in order that students may scientifically study their own social behavior.

The courses are so arranged that students receive day-by-day help and guidance with the actual problem situations of their everyday living which involve speech. Oral reports, literary readings, term papers, and panel discussions prepared for other courses are first shared with the students in the Oral Communication class. These "previews" or "rehearsals" give student speakers a chance to foresee audience opinion and audience response. On such occasions they also receive constructive comments and criticisms from the students and the instructor in the speech laboratory. All students in speech courses are also encouraged to take advantage of the Speech Counseling program of the college.

Three fairly different types of speech training are offered in the General College, but none of the courses directly attempt to prepare students for professional careers in the fields of the radio, the theater, or speech education. The courses are concerned mainly with the speech needs and abilities of students who wish to develop poise and spontaneity in typical speech situations such as the interview. There are no prerequisites and no special ability or talent is required for any course. However, many of the projects in the two courses (Speech Laboratory and Speech Studio) are identical. Students should read the following course descriptions very carefully because the Speech Laboratories and Speech Studios are adapted to the needs and talents of students with *different* backgrounds of speech interest and speech experience.

G.C.32A-32B-32Cf,w,s†—Fall, winter, and spring quarters. Sections 1, 2, 3, 4, 5.

#### SPEECH LABORATORY.

This is a basic course for students who wish training and experience in informal speaking, i.e., discussion, recitation, conversation, conference, and interview. An attempt is made to develop in the student an objective consciousness of

† A fee of \$1.50 per quarter is charged for this course.

his own speech habits such as vocal patterns, posture, clearness of statement, and emotional adjustment. He is motivated to set out on a lifelong program of speech improvement which will tie in effectively with his total personality growth.

Informal round-table discussion is coming, in our day, to play an increasingly significant part in the fields of education, business, and government. The ability to adjust with confidence and poise to the conversational situation is an asset which adds much to the total social effectiveness of any personality.

The laboratory experiences involved in this course are set up for those students who feel in definite need of practical training and experience as conversationalists. Individual guidance is provided by the instructors to aid students in the discovery of techniques both effective and socially acceptable in the informal conference situation. Guest conversationalists are invited frequently to the laboratory to discuss topics of real interest to the students enrolled. Stimulating field trips and moving pictures are used to give the student conversationalists significant material to discuss in an impromptu fashion. "Canned conversations" will be just as taboo in the Speech Laboratory as they are in our everyday contacts.

The group discussions are primarily concerned with the problems and life relationships which are of vital and immediate interest to college students. Experimental projects in critical listening enable the students to discover whether or not they, as individuals, are susceptible to the nonrational appeals of radio propagandists.

Through the co-operation of the Visual Education Service each student is given an opportunity to make two voice recordings per quarter, and moving pictures will be taken of those students remaining in the course during the fall, winter, and spring quarters. Enrolment limited to 25 students. 2 credits per quarter. Mr. Dusenbury.

G.C.33A-33B-33Cf,w,s‡—Fall, winter, and spring quarters. SPEECH STUDIO.

Here students are given opportunities to read and broadcast poetry, novels, plays, and essays "for the fun of it." Those students who enroll try their hand at writing and interpreting short stories. Some of the workshop members write and produce radio scripts. Others present character sketches and pantomimes to the "workshop" audience. Choral reading of original poetry and other forms of imaginative literature help the students achieve flexible and pleasant voice patterns.

The Speech Studio is not a course designed to prepare students for professional careers in radio or on the stage. The recreational aspect of oral reading is stressed rather than the details of professional platform technique. No marked ability in acting or interpretation is required. Enrolment limited to 25 students. 2 credits per quarter. Mr. Dusenbury.

### PHYSICAL SCIENCE

*Certain courses in the Physical Science Studies may be elected as a part of the comprehensive areas in Home Life and Vocational Orientation, pages 24-25, 26-27. A comprehensive in the Physical Science Studies is also available for those students who wish to elect it.*

G.C.37Af—Fall quarter. PHYSICAL SCIENCE: Energy and Matter.

Fundamental physical concepts, nature of gases, liquids, and solids, forces and motion, heat, electricity and magnetism, light.

‡ A fee of \$1.50 per quarter is charged for this course.

When we look at the complex world about us and see its magical phenomena we take it all for granted unless our curiosity leads us to ask why the sky is blue and the sunset red, how the household refrigerator works, why some of us wear glasses, what causes dew, fog, clouds, hail, and rain, what is sound, why do we have winter and summer, how does the thermostat control room temperature. More remarkable is the fact that everything in the universe is built up of only 92 different kinds of atoms, these in turn being built up entirely of electrons, protons, and neutrons. In other words all physical properties are functions of the properties of electrons, protons, and neutrons, or groups of electrons, protons, and neutrons. With matter is always associated the phenomenon we call energy. Here is the most fascinating study outside of life itself, and no student is so intellectually stagnant that he has never searched nor asked for an explanation of some physical phenomenon. No matter what one's position in life may be, a knowledge of scientific method, an appreciation of scientific philosophy, and a scientific attitude towards all things is necessary for the mentally well-balanced man.

The main topics for study are the fundamental physical concepts such as energy, matter, and time; the laws of energy and motion explained in simple mathematical language; heat and molecular motion; electricity and magnetism; and how matter emits the radiation we know as light. 5 credits. Mr. Vaughan.

G.C.37Bw—Winter quarter. PHYSICAL SCIENCE: The Nature of Chemistry.

The material objects which we now regard as necessities have increased and changed so remarkably during the past thirty years through the development of the science of chemistry as to be almost unbelievable. This science has raised the standard of living, has given beauty and usefulness to our homes and the clothes we wear, has provided new weapons in man's fight against disease, has given us the means to refertilize our rapidly wearing out land, has given us new and interesting materials for all purposes. To show how these effects have been brought about is our objective.

The lecture topics for study are the development of the fundamental concepts of chemistry; why and how such chemical changes as oxidation and reduction take place; the chemistry of foods, dyes, building materials, paper, clothing materials, explosives, photographic film, and other materials. 5 credits. Mr. Hardy.

G.C.37Cs—Spring quarter. PHYSICAL SCIENCE: Sound, Astronomy, and Technology.

This quarter's work in the study of physical science is divided into three main sections: sound, astronomy, and technology.

The production, transmission, and reception of sound, together with the design of auditoriums and classrooms for better acoustical properties, is considered in the first of these divisions.

Three weeks are devoted to work in the field of astronomy, the lectures being designed to acquaint the students with the principal features of the heavens, to make them aware of the fact that the earth and even our solar system are not alone in space, and to give them a better realization of the place of man in the material cosmos.

The third part consists of a series of lectures concerning the technological applications of physics and chemistry in manufacturing, building, transportation, communication, and how the engineer and architect utilize and apply the principles of the basic sciences of mathematics, physics, and chemistry to the satisfaction of human wants.

Explanations are necessarily brief but serve as an introduction for the students to further reading and study. Our approach to the study of the physical sciences is not that of the professional scientist but that of the man who desires a knowledge and an appreciation of scientific method and attitude and wants it as a necessary part of his own cultural pattern. 5 credits. Mr. Vaughan.

#### CONSUMER RELATIONS OF PHYSICAL SCIENCE

This course is planned for the student who is more interested in the effects and results of science than in pure science itself. This means that the great numbers of minor details of science are not necessarily a part of the instruction except as they need to be brought in to answer a particular question. The broad aspects of science—those which show how science has both complicated and helped in solving many problems—are considered.

G.C.38Aw—Winter quarter. CONSUMER RELATIONS OF PHYSICAL SCIENCE.

The first quarter is concerned with the principles of science and arithmetic which are necessary in order to buy consumer goods intelligently. The scientific method is applied to the problems of making a choice between the various brands and types of commodities which it is necessary for us all to buy. The whole first quarter is devoted to the consumer's problems in understanding the meaning of new developments and applications of science to the things he uses and does on the job, in the home, and during his leisure time. The application of the scientific method to these problems makes it necessary to know the facts. Knowing the facts may lead to the fundamental laws and concepts of science. And so the laws and principles of science are studied wherever and whenever they hold the answer to the problem. Limited to 100 students. 2 credits. Mr. Vaughan.

G.C.38Bs—Spring quarter. CONSUMER RELATIONS OF PHYSICAL SCIENCE.

The second quarter is devoted to a study of the effects of science on the larger groups more than on the individual. This includes problems concerning our standards of living, distribution of commodities, uses and conservation of natural resources, and the effect of new ways and new products on labor. Current articles appearing in magazines such as *Harper's*, *Fortune*, etc., are used considerably in this quarter of the course. These articles are discussed from the standpoint of the effect that science has had upon the problem being considered. No previous science training is necessary for enrolment. Limited to 100 students. 2 credits. Mr. Vaughan.

#### PSYCHOLOGY COURSES

*Practical Applications of Psychology may be elected as a part of the Individual (pp. 23-24) and Vocational (pp. 26-27) Orientation comprehensives; Human Development and Personal Adjustment as a part of Individual Orientation (pp. 23-24). Human Development and Personal Adjustment, may also be combined with Human Biology (pp. 28-29), to make up the Human Development comprehensive.*

Psychology is concerned with human activity. Because every person is influenced by the behavior of other people, it is wise to study this behavior for its practical significance.

The aim of this course is to present a picture of the ways in which the human being meets the problems of his environment and develops the many traits which

are called personality. It seeks to answer the question, "Why do we behave as we do?"

G.C.41A-Bf—Fall quarter. PRACTICAL APPLICATIONS OF PSYCHOLOGY.

The first half of the course considers why college students and others differ one from another. Such questions are discussed as: What is mind? Are all men created free and equal? What is intelligence? What is an I.Q.? How is intelligence measured? Is there more than one kind of intelligence? Can we improve intelligence? Are women smarter than men? Is it true that women never reason? Why are different races of people different? What part does age play in individual differences? Are two people ever exactly alike? Can intelligence be ascertained by the shape of the head and face? Do the stars influence our behavior? Can we read people's minds? Can behavior be predicted from handwriting? Are all blondes fickle? And is there anything to numerology?

In what ways do differences come about? How are all our various traits developed? The part played by the nervous system in behavior: how we hear, see, state, smell, and the like; what traits we are born with and what we acquire; what causes emotion; whether emotions are always bad; the way in which advertisers and salesmen play upon our emotions in selling us their products; how we can build up sales resistance; why we fight, become angry, and fall in love; the part played by the glands in emotional behavior, also the influence they exert in our physical development.

The second half of the quarter's work helps to form a more complete picture of the individual. It deals with questions of how we learn; how we improve our memories; how we break bad habits and build up good ones; how age influences learning; how other people shape our behavior; what is hypnotism; what is mob behavior; what gives rise to new things such as inventions; what is personality; whether it is possible to have two entirely different personalities; how personality is measured; how we can learn to get along with other people; the kind of work we are best fitted for; and how we can develop healthy, normal, and pleasing personalities.

Having seen how people differ, how these differences come about, and how our traits are combined into personality, the discussion finally centers upon how personality breaks down; what happens when we go crazy; why drunkards see snakes; whether insanity can be cured; how to reduce insanity; the characteristics which make people "peculiar"; if a genius is insane in some respects; what is a complex; what is psychoanalysis; if insanity is hereditary; what happens when people see visions; what is an introvert, an extrovert; why we sometimes think everyone is looking at us or talking about us; what happens when we have the "blues"; why some people think they have every disease they hear of; why we sometimes think the world "has it in for us" and at other times we feel that life is perfect.

Throughout the course stress is laid upon the practical aspects of psychology rather than upon attempting to train the student to become a specialist in the field of human behavior. 6 credits. Mr. Carlson, Mr. Longstaff.

G.C.41Aw-41Bs—Winter and spring quarters. PRACTICAL APPLICATIONS OF PSYCHOLOGY.

This course repeats during the winter and spring quarters the work covered in the fall quarter and described above as G.C.41A-Bf. 3 credits per quarter. Mr. Longstaff.

## HUMAN DEVELOPMENT AND PERSONAL ADJUSTMENT

Each individual will spend a major portion of his life in adjusting to others. His effectiveness and happiness will depend in large part upon his personal social relations. It is important, then, that he have insight not only into his own mental and social life, but also into that of his companions and associates. To understand oneself and others, one should know something of the road which all travel in reaching maturity and something of the avoidance, by the cultivation of effective attitudes and sound personal relations, of its pitfalls and dangers. In recent years much has been learned of the development of normal and of maladjusted individuals, of the causes of delinquency and insanity, of the nature of mental peculiarities, and of the basic principles of mental hygiene. Such knowledge has come from the study of children and adolescents, of family and home life, and of personal and social adjustment in the practical world of affairs. It is the aim of this course to bring to the student such knowledge of himself and of others as will assist him in meeting his own life problems, in gaining insight into the motives and behavior of others, and in undertaking the responsibilities of family life.

G.C.42A<sub>f,w</sub>—Fall and winter quarters. HUMAN DEVELOPMENT.

In order to understand ourselves and others, some knowledge of the developmental course all humans follow is necessary. Much of what we are and how we feel and act can only be understood in terms of our earlier experiences and of our childhood. Hence, this portion of the course presents a general outline of childhood and adolescence by surveying physical growth, learning, and development of motor, linguistic, intellectual, and social skills, emotional life and adjustment, etc. While the normal course of development is stressed, behavior difficulties are also given some attention. 3 credits. Mr. Anderson, Mr. Harris.

G.C.42B<sub>w,s</sub>—Winter and spring quarters. PERSONAL ADJUSTMENT.

Building upon the groundwork of the first quarter, this section of the course deals with the problems facing adolescents and young people in their personal and social relations. One purpose of the course is to show that the presence of conflicts and difficulties is not unique but universal. The origin and nature of attitudes and complexes is pointed out and the relation of attitudes and conflicts to social pressures analyzed. Emphasis is given to effective adjustment as well as to maladjustment. Principles of mental hygiene are stressed. In the latter half of the quarter special attention is given problems of marriage and family life in order to lead the student to understand the behavior of himself and his associates and to reflect on his coming responsibilities. 3 credits. Mr. Anderson, Mr. Harris.

## SOCIAL SCIENCE

*Contributing courses in the Social-Civic Orientation area are to be selected from the Social Sciences. Certain courses from this group may also be selected as contributing to the Home Life and Vocational Orientation areas (pp. 24-25, 26-27).*

G.C.45A<sub>f</sub>-45B<sub>w</sub>-45C<sub>s</sub>—Fall, winter, and spring quarters. THE UNITED STATES IN WORLD CIVILIZATION: The History of the American People.

In these days of rapid change, of uncertainty, and of crises, it is well sometimes to pause and consider how "We, the people of the United States" came to be what we now are, in other words, to weigh our historical heritage. This is the

purpose of the course, *The United States in World Civilization*. Throughout, the emphasis is on probing into the past in order to throw light on the present. With twentieth-century America as the frame of reference, we study our national origins, consider the contributions to our culture of those who landed at Ellis Island, as well as of those who landed on Plymouth Rock, and trace the development of present economic, political, and social patterns of thought and action. We see how people in other times met, or failed to meet, problems similar to our own, and consider the significance of the ever present factor of change in American culture. How the American people have been influenced by world events, by the ideas and actions of people in faraway times and places, and how they, in turn, have affected them, is an important part of the course. Limited to 150 students. 2 credits per quarter. Miss Ylvisaker.

G.C.46Af—Fall quarter. THE AMERICAN CITIZEN AND HIS GOVERNMENT.

Popular government rests upon the principle that it is every citizen's business to see that his community is well governed. But, as Lord Bryce pointed out, what is everybody's business is likely to be nobody's business, for most citizens hesitate to assume responsibility. It has therefore been typical of American political life to find the affairs of the community managed by a relatively small part of the body of citizens, motivated often by self-interest. Those who should have been leaders in the political life have been especially slow to interest themselves in public affairs, whereas they ought to be in the forefront. Too many people in the United States have regarded politics as a business to be avoided by those wishing to be thought respectable.

As is discussed in G.C.46Bw, the functions and problems of government have now expanded to such an extent that politics touches everyone directly, constantly, intimately, and inescapably. It will be increasingly difficult for Americans who have gone to college to remain indifferent to politics, and at the same time many will be anxious to assume the increasing responsibilities which democracy places upon them.

This course is designed to equip the citizen who wishes to, and who should, take his share of the responsibilities as an intelligent member of a self-governing state, and to aid him in making his participation more effective. The structure of the American local, state, and national government is described with particular attention to the ways in which the various parts of the structure operate and affect the citizen.

Constant reference is made to contemporaneous problems and developments in the field of American government, and for this, selected newspaper and periodical material is used. Instead of, for example, following some text account of the way in which a bill becomes part of the laws which govern our conduct, the progress of legislation in a legislative body is followed through with the aid of press and other accounts. A similar treatment is given to the problems of law enforcement, administration of government, the role and activities of the political party, the place of the executive in our government.

Likewise attention is given to the more important contemporary problems and trends in American government, such as the question of constitutional reform, changes in the structure of government, problems of governmental finance—national, state, and local.

The various ways in which the citizen can take an active part in public affairs are analyzed carefully, and to this end the functioning of the political party is

studied. Attention is also placed on the relations between the civil service of the state and the citizens, particularly those with college training.

Most citizens will have to be content with merely voting in primaries and elections as their share of government, but to point out the wider possibilities of popular control over public affairs is the main purpose of this course. Limited to 250 students. 3 credits. Mr. Kirkpatrick.

G.C.46Bw—Winter quarter. THE FUNCTIONS AND PROBLEMS OF GOVERNMENT.

Recent political and social changes in the United States have served to emphasize the question of the proper role of government, and there is a wealth of material on such questions as "individualism," socialization of economic functions, and the growth of the service functions of the state.

The course includes a survey of the origin and nature of government, emphasizing the social, racial, religious, and economic factors which have influenced the development of governmental institutions and services. An examination is made of the points of view of the fascist, the socialist, the communist, and others who have definite opinions on the role that governments should play in present-day life.

An examination is next made of the functions which government now performs in this country. One of the objectives of the course is to show the evolutionary and constantly expanding role of government in human society, and to indicate, by selected readings in textbooks and current periodical literature, the causes and possible results of this expansion. Starting with some function which is now taken for granted, such as police or fire protection, the course moves on to the discussion of functions which are now in the foreground, such as industrial regulations, state planning, state ownership, and economic security. Stress is laid on the changing economic and social conditions which are bringing changes in governmental action. Some attention is placed on the machinery with which government carries on its manifold services; the position of the civil service, and the relations of the college student to government employment, are treated. Limited to 250 students. 3 credits. Mr. Christensen.

G.C.46Cs—Spring quarter. INTERNATIONAL RELATIONS.

The informed citizen needs to know the problems not only of his own country, but also those of other nations, and of the world on which America so much depends. Finance and business, science and education, have become international, and nations have become increasingly interdependent. To survey this field the college offers this course.

The lectures deal with the international problems of the principal nations of Europe and the Far East, and with their internal affairs where these affect the international situation. The emphasis is placed upon the post-1919 period, but attention will be drawn to pre-1914 events where this is necessary for elucidating the present situation, e.g., France's policy toward Germany. The first part of the course deals with the salient features of the foreign policies of the principal powers. Outstanding problems are then discussed, e.g., the Polish question, the Nazi internal and foreign policy. Attention is drawn to the significance of these questions as illustrations of such general principles as nationalism and imperialism. The efficacy of disarmament conferences and the Kellogg Pact is considered in the light of the previous discussions of specific problems. The schedule of lectures will be altered in order to explain any outstanding current developments, whether in internal or in foreign affairs. Limited to 250 students. 3 credits. Mr. Mills.



G.C.47Af,w,s—Fall, winter, and spring quarters. SOCIAL SCIENCE LABORATORY.

Education is often criticized for substituting theory for actuality. This charge can most justly be preferred against the social studies, whose whole concern should be social reality. The laboratory course in social science offers an unusual opportunity to remedy this defect of education—to approach theory through actual observation of, and participation in, contemporary society and its problems. This might be called a functional approach to the social sciences, making the form of the course follow the observed functions of society.

Specifically, the students in this course make an intensive study of social phenomena, using the Twin City area as their laboratory. Such problems as housing, the interaction of farm and city in this area, the functions of public education in a state university are examples of material which would be included in a course of this kind. Since the course is open only to advanced students in the social-civic area, these and other problems are studied on a more advanced level than they are in the beginning courses. Field trips to enable the class to study social problems first hand are arranged.

The course is open only to students who have passed the Social-Civic comprehensive with a grade of at least C. It is given under the direction of the co-ordinators in the social-civic area. Limited to 40 students each quarter, no student may take this course for more than one quarter. 3 credits. Miss Ylvisaker, Mr. Wilson, co-ordinators.

G.C.48Aw—Winter quarter. OUR ECONOMIC LIFE: Problems of Consumption Economics.

The individual in our modern society comes in almost daily contact with various business organizations and enterprises. These institutions influence his conduct not only through the prices that have to be paid but also by the method of organization through which they operate. The following courses attempt to answer some of the questions raised by these relations and to explain how business enterprise functions. They are not intended to be training courses for business, but to give an understanding of this system and of the relations it bears to the individual members of society.

Nearly every day each of us buys something. It may be an ice-cream cone, a book, or any one of a host of other commodities. We are all consumers. But there is a great gap between the satisfactions we can get from the commodities we use if we are intelligent, and what we can get if we are ignorant, consumers. Economic ignorance can and does every day interfere with our enjoyment in countless ways. It makes us wasteful; robs us of satisfaction; lays us open to "chiselers"; leads us to buy carelessly; leads us to mistrust dependable specialists; and causes us to blame our leaders for troubles that we have caused. This course is offered to help us to become more intelligent consumers and citizens.

With this object in mind consideration is given to such matters as: How are limited supplies of goods and services rationed among those desiring them? How will the particular tasks to be performed by each individual be determined? Of what does income consist? What influences the price consumers pay for commodities? What factors, other than income, influence the consumer's purchases? Through whose hands do the goods pass before they are ready for the consumer? What attitude should the consumer take toward advertising? How can people reduce their insecurity? What can be done to make for more intelligent consumption? Enrolment limited to 150 students. 3 credits. Miss Canoyer.

G.C.48Bs—Spring quarter. *OUR ECONOMIC LIFE: Problems of Production, Finance, and Credit.*

Goods purchased must be paid for. From what sources does the buyer secure money and credit with which to make these purchases? What determines his wages or salary and the amount he can earn on his investments? What various institutions are willing to pay him interest for the use of savings and how can they afford to pay it? What part do the banks play in this system? What is a national bank? a branch bank? a chain bank system? In what way may other financial institutions serve him? Enrolment limited to 150 students. 3 credits. Miss Canoyer.

G.C.49Af—Fall quarter. *FORMATION OF PUBLIC OPINION.*

Modern techniques designed to shape attitudes, to influence public opinion, to affect social values, and to exert leadership, include powerful media of mass appeal. The techniques employed to transmit visual and auditory impressions by newspapers and magazines, by radio, motion pictures, and advertising are examined. Special attention is given to the propaganda devices of civic, economic, racial, political, and other groups, and to the analysis of these groups and their social objectives. The relationships of the pressure groups to propaganda are explored through study of a number of campaigns to sway public opinion. War-time propaganda and its results, and the censorship exerted in times of emergency are discussed. The rise of press agency is included, as well as the work of the public relations counsel, and educational services by special interest groups and governmental agencies. 3 credits. Mr. Ford, Mr. Casey, Mr. Wilson.

G.C.50Af—Fall quarter. *SOCIAL TRENDS AND PROBLEMS.* (Not offered 1941-42)

This course begins with a four-week introduction to basic concepts in the process of social change, followed by illustration of these principles in religion, one of our basic social institutions. The next three weeks are devoted to an analysis of the meaning of population trends in the United States, with special reference to Minnesota and the Twin Cities, for the future of our present student group. The remainder of the quarter is given over to a study of the social factors affecting use of leisure time. Limited to 100 students. 3 credits.

G.C.50Bw—Winter quarter. *SOCIAL TRENDS AND PROBLEMS.* (Not offered 1941-42)

This quarter's work is devoted to a study of certain major social problems which are likely to affect the student's future life, either directly or indirectly, through increasing costs of living. Among the problems considered are: public relief during prosperity, public relief during depression, the social problem of old age, social aspects of mental disease and feeble-mindedness, suicide, prostitution, juvenile delinquency, and crime. Limited to 150 students. 3 credits.

G.C.50Cs—Spring quarter. *THE SOCIOLOGY OF THE FAMILY.* (Not offered 1941-42)

The emphasis during the quarter is on major social trends which are affecting and changing the American family. Among the social influences considered are: culture, conflict, religion, economic changes, illegitimacy, trends in the sex codes, and birth control. Trends in the marriage rate and their interpretation are considered, and the major problems of desertion and divorce are considered in the light of the social trends affecting the family. Limited to 150 students. 3 credits.

## MISCELLANEOUS CONTRIBUTING COURSES

G.C.55Af,w,s—Fall, winter, and spring quarters. INDIVIDUAL STUDY.

In accordance with the General College policy of molding integrated courses to meet the needs of individuals, a few second year students who have demonstrated unusual interest and progress in a particular area may undertake an additional related problem for extra credit. In this manner they may penetrate more deeply into the subject matter and relationships than would ordinarily be possible within the usual time limit of the class meetings and regular preparation for a particular course. The results of such an investigation or project may take the form of a written paper or creative activity as evidence of extra work done, and the student may receive a letter grade as well as credit or merely the extra credit to apply towards the credit requirements for the degree.

Registration for this course of study will be made only by conference with one of the administrative officers and upon recommendation of the faculty member under whose direction the work is to be undertaken. A definite plan must be submitted which gives a general outline of the nature and scope of the problem. The exact amount of extra credit to be given will be determined in advance. The maximum number of extra credits which may be allowed is five per quarter. Registration will be limited to second year General College students who have shown evidence of the ability and initiative needed to carry on this type of work.

G.C.56Af—Fall quarter. HOME LANDSCAPE PLANNING.

*This course may be elected as part of the General Arts comprehensive, pages 32-35.*

An introduction to the principles of landscape design and their use in decorating the home grounds; the planning of small places, garden design, and landscape compositions. The purpose of this course is to make the home grounds a more useful, livable, and attractive place by improving and beautifying them. This work also serves as a background for the pursuit of the popular hobby of gardening. Good and bad examples of home landscaping are demonstrated and illustrated. Since a knowledge of plant materials, trees, shrubs, and garden plants is essential before they can be artistically used in a landscape composition, a study of plant materials is also made during the course as a part of the laboratory work. Independent student projects, such as a problem in the landscaping of typical home grounds and the planning of gardens, serve to give the members of the class an opportunity to put into practice the principles of good landscape planning and composition. Limited to 40 students. 3 credits. Mr. Phillips.

G.C.56Bw—Winter quarter. HOME LANDSCAPE PLANTING AND MATERIALS.

*This course may be elected as part of the General Arts comprehensive, pages 32-35.*

A course for those interested in making the home surroundings beautiful with flowers and plants; and an opportunity for the garden lover to learn more about plants—how, when, and where to grow them. Planting arrangements and composition are particularly stressed. There is included a problem in planting typical home grounds and gardens.

The course is conducted from a cultural and appreciation viewpoint, which should appeal to those who are not especially interested in the purely horticultural and practical phases of the problems of home landscaping. Limited to 40 students. 3 credits. Mr. Phillips.

## G.C.57Aw—Winter quarter. HOME FLORICULTURE AND GARDENING.

Special autumn gardening activities; garden construction and maintenance; growing bulbs in the garden and in the house; plant propagation and culture; special attention to indoor gardening and house plant culture; lectures, demonstrations, and student projects. No prerequisite. Limited to 40 students. 2 credits. Mr. Phillips.

## G.C.57Bs—Spring quarter. HOME GARDENING.

*This course may be elected as part of the General Arts comprehensive, pages 32-35.*

A course for those who are interested in making their home surroundings more beautiful, and an opportunity for the garden lover to learn more about plants and how to grow them successfully. Attention is given to soils and their improvement, plants and their reproduction, gardens and their care. All the practical phases of ornamental gardening are covered, and there will be student projects in growing plants from seeds and slips, the preparation of flower beds, pruning, fertilizing, planting, and transplanting. Maintenance and care (pruning, cultivating, control of insects and diseases, watering, weeding, etc.). Limited to 40 students. 3 credits. Mr. Phillips.

## G.C.58A-58B-58C. INTRODUCTION TO THE MATHEMATICS OF BUSINESS.

*The Mathematics of Business courses may be elected as a part of the comprehensive in Vocational Orientation, pages 26-27.*

It is common knowledge that mathematics of an advanced nature plays an essential role in science, engineering, and other specialized fields. On the other hand, the most elementary processes of mathematics, such as simple arithmetic, are continually used by all men and women. Between the two extremes, on the one hand, the technical applications and, on the other, the most elementary uses of mathematics, we find a large body of applications which are of extreme importance to the average educated man and woman. Fortunately, the applications in this intermediate field involve the use of only relatively elementary mathematics. For example, a large and important part of the mathematics of finance and insurance, and interesting sections of the field of statistics can be cultivated with the aid of merely elementary algebra and arithmetic. This course, called an Introduction to the Mathematics of Business, presents selected topics from statistics, finance, and life insurance which are of interest and value to any intelligent citizen. These applications of mathematics are presented on the level of a student who may have had only one year of mathematics beyond the eighth grade, but who is willing to master necessary techniques as a price for an efficient treatment of an interesting body of knowledge. The elements of algebra are reviewed as a part of the course.

Registration in the fall quarter is not complete until after placement in the pretest has been determined. This test will be given at the first class meeting. Students should come expecting to take such a test. Those whose previous preparation makes successful achievement in the course doubtful will be advised to take other course work.

## G.C.58Af—Fall quarter. INTRODUCTION TO THE MATHEMATICS OF BUSINESS: Algebraic Methods, Simple Interest, and Logarithms.

Those topics in algebra which find application in later parts of the course are studied; also logarithms and their uses. The extent of the remainder of the course

can be inferred from the following sample problems: If you borrow \$1,000 for ninety days from a bank which charges 6 per cent interest, payable in advance, at what rate do you actually pay simple interest? Suppose that you buy \$1,000 worth of merchandise and that the terms of payment specified by the seller are net cash in 60 days, or 4 per cent discount for cash in 15 days; what is the highest interest rate at which you could afford to borrow money in order to take advantage of the discount offered to you? Enrolment limited to 135 students. 3 credits. Miss Thorp.

G.C.58Bw—Winter quarter. INTRODUCTION TO THE MATHEMATICS OF BUSINESS: Statistics, Compound Interest, and Annuities, with Applications.

The extent of this course can be inferred from the following sample problems: Compute the arithmetic mean of the hourly readings of the temperature yesterday in Minneapolis. How long will it take money to double itself if it is invested (1) at 5 per cent, compounded quarterly, and (2) at 5 per cent, simple interest? How much money in hand today would be sufficient to provide you with \$50 per month for two years, if you were able to invest money at 6 per cent, compounded monthly? In return for a loan of \$1,000 you agree to make equal payments at the end of each three months for four years; if these payments include all interest at the rate of 8 per cent, payable quarterly, find the size of the payments. What rates of interest compounded annually, are equivalent to the interest charges specified by a Morris Plan bank for its various types of loans? 3 credits. Prerequisite, G.C.58Af. Miss Thorp.

G.C.58Cs—Spring quarter. INTRODUCTION TO THE MATHEMATICS OF BUSINESS: Further Applications of Annuities, Depreciation, Bonds, Probability, and Life Insurance.

The extent of this course can be inferred from the following sample problems: Compute the annual rate of depreciation on a motor truck which costs \$1,250 and is worth only \$250 at the end of three years; find the depreciation during each year. Suppose that you bought a \$1,000, 7 per cent bond of the Great Northern Railway at the highest price for which such a bond was sold yesterday on the New York Stock Exchange. What interest rate does this investment yield, assuming that you will hold the bond until its maturity date? Compute the smallest possible annual premium which an insurance company could afford to charge, if it had no overhead expense, in case you should buy an ordinary \$1,000 life insurance policy today. What sum of money, in hand when a man is of age 65, would be sufficient for him to buy a pension of \$100 per month for the rest of his life, under the usual conditions specified by insurance companies? 3 credits. Prerequisite, G.C.58Bw. Miss Thorp.

G.C.59Aw—Winter quarter. INTRODUCTION TO PHILOSOPHY.

*Elective in preparation for the Individual Orientation comprehensive examination, pages 23-24.*

This course is designed to aid students in working out an intelligent philosophy of life with which to meet the problems presented by (1) the world of modern science, and (2) modern society. The following topics are included in the readings and class discussions: the origin of the universe; the nature and existence of God; the problem of evil; freedom of the will; the meaning of truth and knowledge; science, faith, and mysticism; miracles and supernaturalism; the nature of the physical world and of mind; the origin of life; the immortality of the soul; the

naturalistic view of the evolution of mind; the struggle to attain freedom of thought and expression; the meaning and origin of morality; the history of moral ideas; the problem of moral relativity; the reconstruction of morality; the relation between morality and happiness; problems of life and death; marriage and the equality of the sexes; problems of social, political, and economic democracy; racial problems; war and peace. Enrolment limited to 100. 3 credits. Mr. Everett.

G.C.60Af,s—Fall and spring quarters. STRAIGHT AND CROOKED THINKING.

*Elective in preparation for the Individual Orientation comprehensive examination, pages 23-24.*

In contemporary life everyone is faced with practical problems that require straight thinking; he is also called upon by the newspaper and the radio to determine the value of arguments presented to him in favor of a multitude of causes. The penalties for faulty thinking are perhaps more far reaching than they have ever been.

Reasons for faulty thinking are numerous; some of them cannot be helped but others may be diagnosed and treated by study. The material of this course is drawn from student life, from textbooks that are used in other courses in the college, from editorials and public speeches. The student has the opportunity to analyze his own difficulties and to practice on a wide range of material. Some of the pitfalls in the way of straight thinking, for example, insufficient information, emotional bias, and fallacious reasoning, receive detailed attention. Limited to 25 students. 2 credits. Miss Shaw.

G.C.61Af—Fall quarter. SURVEY OF RECREATION ACTIVITIES.

*Elective in preparation for the Individual Orientation comprehensive examination, see pages 23-24.*

This course canvasses the various recreation activities open to the individual or to recreation leaders. Through lectures, discussions, movies, special projects, and demonstrations the course will introduce students to activities that will provide a wholesome use of the increasing amount of leisure time. The course is designed to serve both the student interested in recreation as a profession and the student interested in learning the variety of recreation, leisure time, or hobby activities that may be utilized in one's own life. 3 credits. Mr. Haislet.

#### PHYSICAL EDUCATION FOR MEN

Attention is called to Phys.Ed. 78w, Elements of Scout Leadership, and Phys.Ed. 79s, Camp Craft and Camp Administration. These two courses are open to General College students with a suitable average. For further details see the Bulletin of the College of Education.

1f-2w-3s‡—SPORTS EDUCATION.

All men are required to complete satisfactorily three quarters of sports education, or demonstrate a satisfactory degree of proficiency therein. The Department of Physical Education for Men has developed a new and interesting program in sports education for the General College based primarily upon individual needs. The value of this type of training during one's college years will only become apparent and be realized as time goes on.

As a worth-while leisure time activity, as an important factor in the maintenance of physical and mental health, as a means for the increased visual enjoyment of athletic games and contests, and as a valuable means of social contact, training in sports activities and participation in recreational sports activities should be a part of everyone's general education.

‡ Towel and locker fee of \$1.25; uniform fee of \$1 per quarter.

Therefore, the General College is providing an education in this field through the facilities of the Department of Physical Education for those who are lacking in knowledge, appreciation, and proficiency in sports activities. It is not the purpose to put all students through the same mill of activities. Instead, assignments will be made on the basis of individual needs.

In order to determine individual needs, a preliminary test will be given each man during the first week of the fall quarter. Men who demonstrate all-around knowledge and ability will be exempted from any requirement or be given credit for participation in elective courses or for participation in intramural, extramural, or intercollegiate sports. Others may be given instruction in one or more specific activities. Some men will participate in the survey course for all three quarters, receiving instruction in twelve different sports activities. A smaller group of men who have physical defects will receive instruction in recreational activities in which they can take part in spite of their handicaps. 1 credit per quarter. R. A. Piper, supervisor.

### *Sports Education‡*

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s	Sports Education	II	MWF	CH	Mr. Piper and staff
		III	MWF		
		IV	MWF		
		VI	MWF		

(All freshmen in General College and College of Education)

Fall: touchball, swimming, volleyball

Winter: boxing, wrestling, basketball, golf

Spring: softball, tennis, handball, squash

1f-2w-3s	Sports Education. Elective for sophomores in the General College and any men in all other colleges:				
	Survey Course (including above activities)	III	MWF		
	Beginning Swimming	II	MWF		
	Intermediate Swimming	II	TThS		
	Advanced Swimming	III	MWF		(winter and spring only)
	Lifesaving	III	TThS		
	Miscellaneous Swimming	VI	MWF		
	Boxing	VIII	MWF		(fall and winter only)
		IX	MWF		(fall and winter only)
	Tennis	VII	MWF		(spring only)

Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

### *Individual Activities*

The individual activities program is for men who, because of temporary or permanent physical handicaps, are unable to participate in required physical education classes or to take part in intramural sports. This department is open to all students whether the requirement for physical education has been met or not. The objectives are to organize and teach those with physical handicaps recreational activities, and to prescribe exercises to correct individual defects, in order to provide for richer and fuller adjustment to life both in and after school.

The program offers an opportunity to freshmen, upper classmen, and faculty to discuss personal problems regarding physical development. We also invite all physically handicapped men to enter this program and to learn or continue in

‡ Towel and locker fee of \$1.25; uniform fee of \$1 per quarter.

sports which are specifically adapted to their particular cases. The program offers the following sports activities. 1 credit per quarter. C. R. Osell, supervisor.

	Archery	Fencing	Squash
	Badminton	Golf Driving	Swimming
	Bait Casting	Handball	Table Tennis
	Basketball	Horseshoes	Volleyball
	Dart	Shuffleboard	Weight Lifting

  

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s	Individual Physical Education Activities (by special permission)	III IV VIII VII	MWF MWF MWF MWF	(fall and winter only) (spring only)	Ar

### PHYSICAL EDUCATION FOR WOMEN

The General Course in Physical Education offered in the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program offers an opportunity to take courses for the purpose of body building and conditioning and for the acquisition of personal and recreational skills.

The facilities of the Department of Physical Education for Women, including an 18-hole golf course, tennis courts, three gymnasias, two swimming pools, squash court, large indoor sports room, outdoor playing fields, are available for use by all women students.

Requirement in the General College: 3 quarters (p. 14).

**Statement of fees.**—A physical education fee of \$1.75 per quarter is charged for all starred courses. Maximum fee per student, \$3.50 per quarter.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s, 4f,5w,6s‡	General Course in Physical Education				

#### *Aquatics*

Canoe Paddling (spring)	II	TTh	58WGm	Miss Starr	
Class limited to 15					
Swimming, Beginning‡					
Sec. 1 (fall, spring)	II	TTh	51WGm	Ar	
2 (fall, spring)	III	TTh	51WGm	Ar	
3 (fall, spring)	VI	TTh	51WGm	Ar	
4 (fall, spring)	VIII	TTh	51WGm	Ar	
5 (fall, winter, spring)	IV	MW	51WGm	Ar	
6 (spring)	VI	MW	51WGm	Ar	
Swimming, Advanced Beginning** (winter)					
Sec. 1	III	TTh	51WGm	Ar	
2	VIII	TTh	51WGm	Ar	
Swimming, Intermediate					
Sec. 1 (fall, spring)	IV	MW	58WGm	Ar	
2 (fall, winter, spring)	VIII	MW	51WGm	Ar	
3 (fall, spring)	VII	MW	58WGm	Ar	

‡ A physical education fee of \$1.75 per quarter is charged for this course.

‡ For students with no experience in swimming.

\*\* For students with some experience in swimming.



## DESCRIPTION OF COURSES

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No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s, 4f,5w,6s‡	General Course in Physical Education— <i>Continued</i> Aquatics— <i>Continued</i>				
	Swimming, Advanced (fall, winter, spring)				
	Sec. 1	VIII	MW	58WGm	Ar
	2	VIII	TTh	58WGm	Ar
	Senior Lifesaving				
	Sec. 1 (fall, spring)	VI	TTh	58WGm	Ar
	2 (spring)	IX	MW	58WGm	Ar
	Preliminary Water Safety Instructor's Course§ (winter)	VI	MW	58WGm	Ar
<i>Rhythms</i>					
	Folk Dancing (fall, winter)	II	MW	151WGm	Ar
	Recreational Rhythms—Basic rhythmic training through recreational rhythmic activities				
	Sec. 1 (winter)	VIII	TTh	153WGm	Ar
	2 (spring)	VIII	MW	151WGm	Ar
	Modern Dance, Elementary (fall, winter, spring)	VI	MW	151WGm	Ar
	Modern Dance, Intermediate (fall, winter, spring)	VII	TTh	151WGm	Ar
	Modern Dance, Advanced (fall, winter, spring)	IV	MW	151WGm	Ar
	Social Dancing, Elementary				
	Sec. 1 (fall)	III	TTh	151WGm	Ar
	2 (fall)	III	MW	151WGm	Ar
	3 (winter)	III	MW	151WGm	Ar
	Social Dancing, Intermediate				
	Sec. 1 (fall)	VI	TTh	151WGm	Ar
	2 (fall)	VIII	TTh	153WGm	Ar
	3 (winter)	VI	TTh	151WGm	Ar
	Tap Dancing, Elementary (winter)	III	TTh	153WGm	Ar
<i>Individual Sports and Activities</i>					
	Archery, Elementary				
	Sec. 1 (fall)	I	MW	60WGm	Ar
	2 (fall, spring)	IV	MW	60WGm	Ar
	3 (fall)	VI	MW	60WGm	Ar
	4 (fall, winter, spring)	VI	TTh	60WGm	Ar
	5 (winter)	VII	MW	60WGm	Ar
	6 (winter)	VIII	MW	60WGm	Ar
	7 (spring)	III	TTh	60WGm	Ar
	Archery, Intermediate				
	Sec. 1 (fall, winter)	III	MW	60WGm	Ar
	2 (spring)	VIII	MW	60WGm	Ar
	3 (winter)	I	TTh	60WGm	Ar
	4 (spring)	II	TTh	60WGm	Ar
	Badminton, Elementary				
	Sec. 1 (fall)	III	TTh	60WGm	Ar
	2 (fall)	VIII	TTh	60WGm	Ar
	3 (winter)	I	MW	60WGm	Ar
	4 (winter)	VI	MW	60WGm	Ar
	5 (spring)	VI	TTh	153WGm	Ar
	6 (spring)	III	MW	153WGm	Ar

‡ A physical education fee of \$1.75 per quarter is charged for this course.

§ This course covers the review required by the Red Cross for all candidates for the rank of water safety instructor.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s, 4f,5w,6s‡	General Course in Physical Education--Continued				
	Individual Sports and Activities--Continued				
	Badminton, Intermediate				
	Sec. 1 (fall)	II	TTh	60WGm	Ar
	2 (fall, winter)	VI	TTh	153WGm	Ar
	Bowling				
	Sec. 1 (fall)	II	MW	151WGm	Ar
	2 (fall)	III	MW	151WGm	Ar
	3 (winter)	II	TTh	151WGm	Ar
	4 (winter)	III	TTh	151WGm	Ar
	5 (winter)	II	MW	151WGm	Ar
	6 (spring)	II	MW	151WGm	Ar
	7 (spring)	II	TTh	151WGm	Ar
	Golf, Elementary§				
	Sec. 1 (winter)	IV	MW	60WGm	Ar
	2 (winter)	III	TTh	60WGm	Ar
	3 (winter)	VIII	TTh	60WGm	Ar
	4 (spring)	I	MW	60WGm	Ar
	5 (spring)	III	MW	60WGm	Ar
	Golf, Intermediate§				
	Sec. 1 (spring)	VI	MW	60WGm	Ar
	2 (spring)	VIII	TTh	60WGm	Ar
	Golf, Advanced§				
	(fall, winter, spring)	Ar	Ar	Ar	Ar
	Horseback Riding (fall, spring) (See General Courses for Which No Physical Education Fee Is Charged, p. 55).				
	Individual Body Building				
	Sec. 1 (fall, winter)	II	TTh	153AWGm	Miss Mee
	2 (fall, winter, spring)	III	TTh	153AWGm	Miss Mee
	3 (fall)	VI	MW	153AWGm	Miss Mee
	4 (winter)	III	MW	153AWGm	Miss Mee
	Rifle Marksmanship (spring)				
	Sec. 1	II	MW	151WGm	Ar
	2	VII	MW	151WGm	Ar
	Skating¶ (winter) Plain, figure. Classes meet at Hippodrome.				
	Sec. 1	VI	W	Ar	Ar
	2	VII	W	Ar	Ar
	3	VIII	W	Ar	Ar
	4	VI	Th	Ar	Ar
	5	VII	Th	Ar	Ar
	6	VIII	Th	Ar	Ar
	7	VI	F	Ar	Ar
	8	VII	F	Ar	Ar
	9	VIII	F	Ar	Ar
	Tennis, Elementary‡‡ (spring)				
	Sec. 1	I	MW	153WGm	Ar
	2	III	TTh	153WGm	Ar
	3	IV	MW	153WGm	Ar
	4	VI	MW	153WGm	Ar
	5	II	TTh	153WGm	Ar
	6	II	MW	151WGm	Ar
	Tennis, Intermediate‡‡ (spring)				
	Sec. 1	I	TTh	153WGm	Ar
	2	II	MW	153WGm	Ar
	3	III	MW	151WGm	Ar
	Tennis, Tournament‡‡ (spring)				
		VIII	TTh	151WGm	Ar

‡ A physical education fee of \$1.75 per quarter is charged for this course.

‡‡ Students taking tennis must pay \$.50 toward a tennis permit.

§ Students must supply their own equipment.

¶ Students should have a free hour before or after the skating class. Class meets for a two-hour period.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s, 4f,5w,6s†	General Course in Physical Education—Continued				

*Team Sports and Activities*

	Baseball (spring)	VI	TTh	151WGm	Ar
	Basketball, Elementary (winter)				
	Sec. 1	VI	MW	153WGm	Ar
	2	VIII	MW	153WGm	Ar
	Basketball, Intermediate (winter)				
		II	TTh	60WGm	Ar
	Posture and Daily Life Skills				
	Sec. 1 (fall)	I	MW	151WGm	Ar
	2 (fall)	IV	MW	153AWGm	Ar
	3 (winter)	II	MW	153AWGm	Ar
	Introductory Course in Sport Skills				
	Sec. 1 (fall)	III	MW	153WGm	Ar
	2 (winter)	IV	MW	153WGm	Ar
	Spectator's Survey of Sports and Rhythm (winter)—Movies, demonstrations, talks by experts on sports and rhythms.				
		IV	MW	201WGm	Ar
	Volleyball				
	Sec. 1 (fall)	III	TTh	153WGm	Ar
	2 (fall)	IV	MW	153WGm	Ar
	3 (winter)	II	MW	153WGm	Ar

*General Courses for Which No Physical Education Fee Is Charged*

7f,w,s	Lectures in Health and Physical Education				
	Sec. 1 (fall, winter, spring)	III	TTh	201WGm	Ar
	2 (fall)	II	TTh	201WGm	Ar
	3 (fall, winter)	VI	MW	201WGm	Ar
8f,s,††	Horseback Riding (fall, spring)				
	Sec. 1 (Intermediate and Advanced)	VI	MW	Ar	Ar
	2 (Beginning)	VII	MW	Ar	Ar
	3 (Beginning)	VI	TTh	Ar	Ar
	4 (Intermediate and Advanced)	VII	TTh	Ar	Ar

*Elective Courses*

54s	Camp Leadership (2 cred.; no prereq.)	IV and 1 hr.			
		ar	MW	201WGm	Miss Starr
80w	Principles of Rhythm (2 cred.; prereq. some rhythm experience)	II	WF	201WGm	Miss Baker

*Recreational Activities for Which No Registration Is Required*

FALL	WINTER	SPRING
Horseback Riding	Basketball	Baseball
Volleyball	Swimming	Horseback Riding
Swimming	Winter Sports	Tennis
Archery	Badminton	Golf
Badminton	Archery	Badminton
Rifle Marksmanship	Rifle Marksmanship	Swimming
Fencing	Social Dancing	Archery
	Fencing	

† A physical education fee of \$1.75 per quarter is charged for this course.

†† For horseback riding, students pay \$.50 per lesson. Students should have a free hour after the riding class. Class meets for one hour.

## MILITARY SCIENCE AND TACTICS

## GENERAL INFORMATION

The Department of Military Science and Tactics is a federally subsidized and supervised part of the Reserve Officers' Training Corps. Satisfactory completion of the four-year course qualifies the enrollee for a reserve commission in the Army of the United States. The general object of the courses of instruction of the Reserve Officers' Training Corps is to qualify students for positions of leadership in time of national emergency.

Courses in all units are elective. A member of the R.O.T.C. is not in the Army of the United States and membership in the R.O.T.C. carries no legal obligation to serve in the Army or any of the armed forces either in peace or in war.

Three units are maintained:

Coast Artillery Corps (Anti-Aircraft)

Signal Corps

Medical Corps

All students electing these courses are given the instruction prescribed for the Basic and Advanced Courses, Coast Artillery Corps, Signal Corps, or Medical Corps, Reserve Officers' Training Corps, as the case may be, and are governed by the following conditions:

## BASIC COURSES

The Basic Courses consist of six quarters of three hours of work per week, for which one credit per quarter is accepted towards graduation. The Signal Corps Course is open to physically qualified male students in Electrical Engineering, or those whose programs will qualify them for enrolment in the Signal Corps Advanced Course in the supply, cryptographic, or photographic specialties. The Medical Corps Course is open to physically fit male students enrolled in the Medical School only. The Basic Coast Artillery Course is open to all physically qualified male students registered in the Institute of Technology and the Division of Forestry, without additional prerequisites. Students in all other colleges may register for the Basic Coast Artillery Course, provided they have had the prerequisite advanced algebra and plane trigonometry, or provided they agree to take and complete these subjects some time during their freshman year (Science, Literature, and the Arts, Math. 1, Higher Algebra, and Math. 6, Trigonometry). For those who are planning to take the Advanced Coast Artillery Course, a course in college algebra is recommended (Science, Literature, and the Arts, Math. 7, College Algebra, or Math. 8, Commerce Algebra). Foreign students are not eligible for enrolment in the Coast Artillery or Signal Corps units.

## ADVANCED COURSES

The Coast Artillery and Medical Corps Advanced Courses consist of six quarters of five hours of work per week, for which a total of eighteen credits is allowed and accepted towards graduation. The Signal Corps Advanced Course consists of four hours of classroom and laboratory work per week, for which a total of fifteen credits is allowed and accepted towards graduation. In addition, completion of certain other academic courses is required. Under provisions of paragraph 45, Army Regulations 145-10, admission to the Advanced Courses is subject to recommendation of the professor of military science and tactics and the approval of the president of the University, selection being made from students who have completed the corresponding Basic Course. Selection is limited to 110

in the Coast Artillery, 25 in the Signal Corps, and 24 in the Medical Corps. No student may be selected for an Advanced Course who has not the equivalent of two years in residence at the University of Minnesota remaining before graduation.

Students enrolled in an Advanced Course receive from the Federal Government a fixed allowance per day while pursuing the course, and with the exception of those of the Medical Unit are also furnished the regulation uniform of an Army officer, which they may retain after graduation. The total government compensation received by an Advanced Course student during his two years of training amounts to approximately two hundred dollars.

Advanced Course students are required to enter into an agreement to continue in the course during their time at the University until completion of same and to attend a six weeks' summer training camp, preferably at the end of the junior year, as prescribed by the Secretary of War. All expenses incident to training camp attendance are borne by the government. The university degree will be withheld until this contract is discharged. Upon the successful completion of an Advanced Course, students are, upon the recommendation of the president of the University and the professor of military science and tactics, eligible for appointment as second lieutenants in the Officers' Reserve Corps of the Army of the United States, in the branch of service to which they are assigned.

#### EQUIPMENT

All instructional equipment except textbooks, and including the basic uniform, are furnished gratis. Textbooks represent the only expense to the student.

The cost of all textbooks used in the Basic Courses varies with the unit in which enrolled, but in no case exceeds five dollars per student. The cost of all textbooks used in the Advanced Courses varies likewise but in no case exceeds seven dollars. The resale of Advanced Course textbooks is not encouraged, due to constant changes in equipment, tactics, and technique.

The Coast Artillery and Signal Corps units are equipped with the latest available types of artillery weapons, fire control and position finding instruments, field radio, telephone and telegraph equipment, etc., while the small bore indoor rifle range is recognized as one of the finest in the United States.

#### COAST ARTILLERY CORPS

Open to physically fit male students (other than foreign students) enrolled in *any* college of the University except students of Electrical Engineering.

**Prerequisites.**—Higher algebra, geometry, and plane trigonometry. Students who do not possess these prerequisites at the time of registration may be accepted if they agree to complete these subjects some time during their freshman year.

**Objective.**—To train qualified battery officers for the direction of anti-aircraft fire.

#### *Subjects*

**First Year Basic Course.**—Leadership; artillery subjects; Army organization; military history and policy; national defense; obligations of citizenship; military courtesy and discipline; military sanitation and first aid; map reading; rifle marksmanship.

**Second Year Basic Course.**—Leadership; weapons and materiel; fire control and position finding; identification of aircraft; naval targets; motor transportation.

**First Year Advanced Course.**—Aerial photograph reading; signal communications; leadership; position finding; conduct of fire; gunnery for seacoast and anti-aircraft artillery; orientation; rifle marksmanship; administration.

**Second Year Advanced Course.**—Military law; military history; leadership; field engineering; combat orders; tactics and technique of seacoast and anti-aircraft artillery; orientation.

## R.O.T.C. CLASS SCHEDULES

## Coast Artillery Corps Unit

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w	First Year Basic Course (1 cred. per qtr.; no prereq.)				
	Class Sections*				
	Sec. 1	I	MW	A	Ar
	2	III	MW	A	Ar
	3	V	MW	A	Ar
	4	VII	MW	A	Ar
	5	IX	MW	A	Ar
	6	I	TTh	A	Ar
	Leadership Sections†				
	Sec. 1	I	F	A	Ar
	2	III	F	A	Ar
	3	V	F	A	Ar
	4	VII	F	A	Ar
	5	IX	F	A	Ar
	6	I	S	A	Ar
	7	VIII	W	A	Ar
	8	VIII	F	A	Ar
	9	II	S	A	Ar
3s	First Year Basic Course (1 cred.; no prereq.)				
	Class Sections*				
	Sec. 1	I	M	A	Ar
	2	III	M	A	Ar
	3	V	M	A	Ar
	4	VII	M	A	Ar
	5	IX	M	A	Ar
	6	I	T	A	Ar
	Leadership Section†				
		V, IX	T	A	Ar
4f	Second Year Basic Course (1 cred.; soph.; prereq. 1, 2, 3, higher algebra and plane trigonometry)				
	Class Sections‡				
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
	4	VIII	MWF	A	Ar
	5	II	TThS	A	Ar
5w	Second Year Basic Course (1 cred.; soph., prereq. 4f)				
	Class Sections‡				
	Sec. 1	II	WF	A	Ar
	2	IV	WF	A	Ar
	3	VI	WF	A	Ar
	4	VIII	WF	A	Ar
	5	II	ThS	A	Ar

\* Sections limited to 120 students.

† Sections limited to 80 students.

‡ Sections limited to 100 students.

DESCRIPTION OF COURSES

No.	Title	Hour	Day	Bldg.	Instructor
5w	Second Year Basic Course— <i>Continued</i> Leadership Sections¶				
	Sec. 1	II	M	A	Ar
	2	IV	M	A	Ar
	3	VI	M	A	Ar
	4	VIII	M	A	Ar
	5	II	T	A	Ar
	6	IV	T	A	Ar
6s	Second Year Basic Course (1 cred.; soph.; prereq. same as 4f) Class Sections§				
	Sec. 1	II	M	A	Ar
	2	IV	M	A	Ar
	3	VI	M	A	Ar
	4	VIII	M	A	Ar
	5	II	T	A	Ar
	Leadership Section				
		V, IX	T	A	Ar
151f	First Year Advanced Course (3 cred.; prereq. 4, 5, 6) Sec. 1	II	MTWThF	A	Ar
	2	IV	MTWFS	A	Ar
	3	VI	MWF	A	Ar
		V	TTh	A	Ar
152w	First Year Advanced Course (3 cred.; prereq. 4, 5, 6) Class Sections				
	Sec. 1	II	MTWTh	A	Ar
	2	IV	MTWF	A	Ar
	3	VI	MW	A	Ar
		V	TTh	A	Ar
	Leadership Sections				
	Any one of the nine 2w or the six 5w hours, but a maximum of six students per section.				
153s	First Year Advanced Course (3 cred.; prereq. 4, 5, 6) Class Sections				
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
	Leadership Section				
		V, IX	T	A	Ar
154f	Second Year Advanced Course (3 cred.; prereq. 151-152, 153) Class Sections				
	Sec. 1	I	MWF	A	Ar
		IX	W	A	Ar
	2	IV	MWF	A	Ar
		IX	F	A	Ar
	3	VI	MWF	A	Ar
	Leadership Sections				
	Any one of the nine 1f hours, but a maximum of ten students per section.				
155w	Second Year Advanced Course (3 cred.; prereq. 54) Sec. 1	III	MWF	A	Ar
		VIII-IX	W	A	Ar
	2	IV	MWF	A	Ar
		VIII-IX	F	A	Ar
	3	IV	TTh	A	Ar
		II	S	A	Ar

§ Sections limited to 100 students.

¶ Sections limited to 80 students.

No.	Title	Hour	Day	Bldg.	Instructor
156s	Second Year Advanced Course (3 cred.; prereq. 54-55)				
	Class Sections				
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
	Leadership Section				
		V, IX	T	A	Ar

### NAVAL SCIENCE AND TACTICS

Bayard H. Colyear, Commander, United States Navy, Professor of Naval Science and Tactics

The Naval Reserve Officers' Training Corps of the University of Minnesota provides a four-year course to selected, physically qualified male students. A student who completes this course is eligible for a commission as ensign, United States Naval Reserve, or as second lieutenant, United States Marine Corps Reserve, provided he applies for the commission, obtains a degree from the University, is recommended by the professor of naval science and tactics, and passes the prescribed physical examination. If the graduate is commissioned as ensign, U.S.N.R., he may, upon graduation, apply for one year of active duty at sea, upon completion of which he may be permitted to take an examination for a commission as an ensign in the regular line of the Navy, provided he is recommended by his commanding officer and is less than twenty-six years of age on June 30 of that year.

Cruises on board battleships, cruisers, and destroyers are held in the Atlantic and Pacific during the summer months of each year. As a prerequisite to a commission, a cruise is required of all students upon completion of the third year of the course, but all Naval R.O.T.C. students are eligible for a cruise each summer.

The course is divided into two groups: Navigation, and Naval Science, the latter being further divided into two parts: the Basic Course consisting of the work of the first two years and requiring one hour of drill and two hours of classroom work per week; the Advanced Course consisting of the work of the last two years and requiring one hour of drill and three hours of classroom work per week, except that only two hours of classroom work are required of students registered as engineering majors.

The Navigation Course requires three hours of classroom work per week. It is covered in three quarters at the convenience of the student but should be completed during the Basic Course.

Credits for the summer cruises are given in the amount of  $\frac{3}{4}$  credit for each two weeks of cruise work. These credits are in excess of degree requirements and do not reduce the number of credits required for a degree in the student's major.

Naval Science and Navigation credits are accepted as fulfilling the requirements for a degree. For the Basic Course  $1\frac{1}{2}$  credits per quarter are allowed, a total of  $4\frac{1}{2}$  credits for each of the two years. For the Advanced Course 3 credits per quarter are allowed, except that students with an engineering major who take only two hours of classroom work per week are allowed only 2 credits, a total of 9 credits for each of the two years (6 credits for an engineering major).

For Navigation Course 3 credits per quarter are allowed, a total of 9 credits for the course.

Uniforms and equipment are furnished to students by the government without charge. All textbooks used are loaned to the student. All Naval R.O.T.C. students



attending cruises are furnished transportation and subsistence. Students enrolled in the Advanced Course are paid monthly commutation of subsistence by the Navy Department, and cruise pay on the Advanced Course cruise. The total pay received from the government amounts to about one hundred ninety dollars (\$190) for the two years in the Advanced Course.

All prospective candidates for the Naval R.O.T.C. MUST apply in person to the professor of naval science and tactics, University of Minnesota, before registering for the course, as enrolments are limited by law and a prescribed physical examination must be taken before the candidate can be considered.

## BASIC COURSES

No.	Title	Hour	Day	Bldg.	Instructor
1f	First-Year Basic Course. (1½ cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	VII	MWF	A	Ar
	4	VIII	MWF	A	Ar
2w	First-Year Basic Course. (1½ cred.; prereq. 1)				
	Sec. 1	III	MW	A	Ar
	2	IV	WF	A	Ar
	3	VI	TTh	A	Ar
	4	VIII	WF	A	Ar
	All sections drill V T; A.				
3s	First-Year Basic Course. (1½ cred.; prereq. 2)				
	Sec. 1	I	TTh	A	Ar
	2	III	TTh	A	Ar
	3	VII	MW	A	Ar
	4	VII	Th	A	Ar
		III	S	A	Ar
	All sections drill IX T; A.				
4f	Second-Year Basic Course. (1½ cred.; prereq. 3)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	VIII	MWF	A	Ar
5w	Second-Year Basic Course. (1½ cred.; prereq. 4)				
	Sec. 1	II	TTh	A	Ar
	2	IV	MT	A	Ar
	3	VII	MW	A	Ar
	All sections drill V T; A.				
6s	Second-Year Basic Course. (1½ cred.; prereq. 5)				
	Sec. 1	I	WF	A	Ar
	2	IV	MW	A	Ar
	3	VI	TTh	A	Ar
	All sections drill IX T; A.				

## ADVANCED COURSE

*Nonengineering Students*

7f	First-Year Advanced Course. (3 cred.; prereq. 6)				
		IV	MWF	A	Ar
		II	S	A	Ar
8w	First-Year Advanced Course. (3 cred.; prereq. 7)				
		IV	MWF	A	Ar
	All sections drill V T; A.				
9s	First-Year Advanced Course. (3 cred.; prereq. 8)				
		IV	MWF	A	Ar
	All sections drill IX T; A.				

*Students with Engineering Major*

No.	Title	Hour	Day	Bldg.	Instructor
7f	First-Year Advanced Course. (2 cred.; prereq. 6)	I	MWF	A	Ar
8w	First-Year Advanced Course. (2 cred.; prereq. 7)	I	WF	A	Ar
	All sections drill V T; A.				
9s	First-Year Advanced Course. (2 cred.; prereq. 8)	I	WF	A	Ar
	All sections drill IX T; A.				

## NAVIGATION

Navigation courses given by the Department of Naval Science and Tactics are open to all university students.

Navigation 1f or 1s. Elementary Navigation and Piloting. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, dead reckoning. Three hours per week for one quarter.

1f	Elementary Navigation and Piloting. (3 cred.; prereq. plane trigonometry)				
	Sec. 1	VI	MWF	A	Ar
	2	VII	MWF	A	Ar
1s	Elementary Navigation and Piloting. (3 cred.; prereq. plane trigonometry)				
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar

Navigation 2f or 2w. Celestial Navigation. Lines of position, the sextant, the astronomical triangle, time and the chronometer, marine surveying, star identification. Three hours per week for one quarter.

2f	Celestial Navigation. (3 cred.; prereq. Nav. 1f or 1s)				
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
2w	Celestial Navigation. (3 cred.; prereq. Nav. 1f or 1s)				
	Sec. 1	I	MWF	A	Ar
	2	VI	MWF	A	Ar

Navigation 3w or 3s. Deep Sea and Aerial Navigation. Determination of lines of position of sun, moon, stars, and planets. Short tabular methods. The navigator's day's work at sea. Chart work and practical problems.

3w	Deep Sea and Aerial Navigation. (3 cred.; prereq. Nav. 2f or 2w)				
	Sec. 1	IV	MWF	A	Ar
	2	VII	MWF	A	Ar
3s	Deep Sea and Aerial Navigation. (3 cred.; prereq. Nav. 2f or 2w)				
	Sec. 1	VI	MWF	A	Ar
	2	VII	MWF	A	Ar

## EXPLANATIONS

**Course numbering.**—A course is designated by a general title, a number, a capital letter, and a small letter. The place of a course in a sequence carrying the same general title is indicated by the capital letter. The quarter is indicated by the small letter (f, fall; w, winter; s, spring; su, summer). Examples:

- 6Af,6Bw,6Cs—a three-quarter sequence, offered in fall, winter, and spring.
- 3Aw,3Bs—a two-quarter sequence offered in winter and spring.
- 1Af,w,s—the first quarter course of a sequence repeated each quarter.
- 4A-Bf—two parts of a sequence combined into one quarter's work.

Courses without capital letters are single courses, not parts of a sequence.

**Buildings.**—A, Armory; Ad, Administration, University Farm; Adm. Administration; Bo, Botany; BoG, Botany Greenhouse; Bu, Burton Hall; C, Chemistry; CCS, Center for Continuation Study; CH, Cooke Hall; CMU, Coffman Memorial Union; CWI, Child Welfare Institute; E, Main Engineering; EdH, Eddy Hall; EE, Electrical Engineering; F, Folwell Hall; HE, Home Economics, University Farm; HS, Health Service; J, Jones Hall; Lib, Library; M, Mines Bldg.; ME, Mechanical Engineering; MeS, Medical Sciences; MH, Millard Hall; MNH, Museum of Natural History; Mu, Music; MurH, William J. Murphy Hall; NMA, Northrop Memorial Auditorium; P, Pillsbury; Ph, Physics; Psy, Psychology; Pt, Pattee Hall; S, Stadium; ShH, Shevlin Hall; VH, Vincent Hall; WeH, Wesbrook Hall; WGm, Women's Gymnasium; Z, Zoology.

### OTHER ABBREVIATIONS AND SYMBOLS

I, II, III, etc.	First hour (8:30 to 9:20), second hour (9:30 to 10:20), third hour (10:30 to 11:20), fourth hour (11:30 to 12:20), fifth hour (12:30 to 1:20), sixth hour (1:30 to 2:20), seventh hour (2:30 to 3:20), eighth hour (3:30 to 4:20), ninth hour (4:30 to 5:20). (At the University Farm, first hour, 8:15 to 9:05, second hour, 9:15 to 10:05, etc., to 1:05, sixth hour, 1:30 to 2:20, etc.)		
Ar.	To be arranged or assigned.	Lect. MTWThFS	Lecture. Monday, Tuesday, etc.
Aud.	Auditorium.	Prereq.	Prerequisite.
Cred.	Credits.	Rec.	Recitation.
Lab.	Laboratory.	Sec.	Section.

## COMPREHENSIVE AREAS AND COURSES

The minimum requirement for permission to take a comprehensive examination is twelve hours of passing course work (preferably fifteen to eighteen) in the area, in addition to other specific requirements stated below.

### 1. INDIVIDUAL ORIENTATION. CORE COURSE: 1A.

The core course, plus a minimum of two quarters of one of the three sequences is required for this comprehensive. Additional work may be selected from any course listed under this comprehensive.

#### Sequences:

Human Biology, 10A, 10B, 10C  
Psychology, 41A, 41B

Human Development and Personal Adjustment,  
42A, 42B

#### Additional Courses:

Individual Orientation, 2A  
Clothing Selection, 15A  
General Arts, 21A, 21B, 21C  
Oral Communication, 32A, 32B, 32C

Sociology of the Family, 50C  
Philosophy, 59A  
Straight and Crooked Thinking, 60A  
Survey of Recreational Activities, 61A

### 2. HOME LIFE ORIENTATION. CORE COURSE: 3A.

The core course, plus additional work selected from the courses listed here, is required for this comprehensive.

Human Biology, 10A, 10B, 10C  
Food Selection, 14A  
Clothing Selection, 15A  
Housing, 16A, 16B  
Sociology of the Family, 50C

Maintenance Aspects and Income Management,  
17A, 17B  
Consumer Relations of Physical Science, 38A,  
38B

### 3. SOCIAL-CIVIC ORIENTATION. CORE COURSE: CONTEMPORARY SOCIETY 5A, 5B or CURRENT HISTORY 6A, 6B, 6C.

One of the core courses, plus additional work selected from the courses listed here, is required for this comprehensive.

United States History, 45A, 45B, 45C  
Government Studies 46A, 46B, 46C  
Economics, 48A, 48B

Formation of Public Opinion, 49A  
Social Trends and Problems, 50A, 50B, 50C

### 4. VOCATIONAL ORIENTATION. CORE COURSE: 8A.

The core course, plus additional work selected from the courses listed here, is required for this comprehensive.

Vocational Orientation Laboratory, 9A  
Human Biology, 10A, 10B, 10C  
Euthenics, 14A, 15A  
Euthenics, 16A, 16B  
Euthenics, 17A, 17B  
Art Today, 22A, 22B, 22C

Art Laboratory, 23A, 23B, 23C  
Physical Science, 37A, 37B, 37C  
Psychology, 41A, 41B  
Economics, 48A, 48B  
Mathematics of Business, 58A, 58B, 58C

### 5. BIOLOGICAL SCIENCES.

A minimum of five of the six courses listed is required for this comprehensive. No student may take both comprehensives 5 and 7.

Human Biology, 10A, 10B, 10C

Basic Wealth, 11A, 11B, 11C

6. GENERAL ARTS. CORE COURSE: 21A, 21B, 21C.

A minimum of one quarter of the core course, plus at least two quarters of one of the five sequences, is required for this comprehensive. Additional courses may be selected from any listed in this area.

Sequences:

Art Today, 22A, 22B, 22C  
 Art Laboratory, 23A, 23B, 23C  
 Music Today, 24A, 24B, 24C  
 Film and Drama, 25A, 25B, 25C  
 Literature Today, 30A, 30B, 30C

Additional Courses:

Clothing Selection, 15A  
 Housing, 16A, 16B  
 Landscaping, 56A, 56B  
 Gardening, 57A, 57B  
 Speech Studio, 33A, 33B, 33C

7. HUMAN DEVELOPMENT STUDIES.

All five courses are required for this comprehensive. No student may take both comprehensives 5 and 7.

Human Development and Personal Adjustment, 42A, 42B      Human Biology, 10A, 10B, 10C

8. LITERATURE, SPEECH, AND WRITING.

Two quarters of Literature Today, plus additional hours, preferably at least one quarter each of Writing Laboratory and Oral Communication, are required for this comprehensive.

Literature Today, 30A, 30B, 30C      Oral Communication, 32A, 32B, 32C  
 Writing Laboratory, 31A, 31B, 31C      Speech Studio, 33A, 33B, 33C

9. PHYSICAL SCIENCE STUDIES.

All three courses are required for this comprehensive.

Physical Science, 37A, 37B, 37C

## SCHEDULE

No.	Title	Hour	Day	Bldg.	Instructor
1Af	Individual Orientation .....				
	Sec. 1	I	MTWF	206WeH	} Mr. Dean
	2	IV	MTWF	206WeH	
1Aw	Individual Orientation .....				
	Sec. 1	II	MWFS	206WeH	
	2	V	MTWF	202WeH	
	3	VI	MWThF	202WeH	
1As	Individual Orientation .....				
	Sec. 1	I	MWFS	206WeH	}
	2	VI	MWThF	202WeH	
	(Each section limited to 50)				
2Aw	Individual Orientation .....	I	TTh	202WeH	} Mr. Dean
2As	Individual Orientation .....				
	Sec. 1	I	TTh	202WeH	
	2	II	TTh	201WeH	
	(Each section limited to 40)				
3Af	Home Life Orientation.....	III	MTWThF	206WeH	} Miss Holmstrom
3Aw	Home Life Orientation.....	I	MTWThF	206WeH	
3As	Home Life Orientation.....	VII	MTWThF	206WeH	
	(Each section limited to 90)				
5Af-5Bw	Contemporary Society .....	I	MWF	101WeH	} Miss Ylvisaker
5Aw-5Bs	Contemporary Society .....	IV	MWF	101WeH	
6Af-6Bw-6Cs	Current History .....				
	Sec. 1	II	TTh	101WeH	} Mr. Wilson
	2	VI	TTh	101WeH	
	(Each section limited to 200)				
8Af	Vocational Orientation .....	VII	MTWThF	101WeH	} Mr. Brayfield
8Aw	Vocational Orientation .....	V	MTWThF	101WeH	
8As	Vocational Orientation .....	I	MTWThF	101WeH	
	(Each section limited to 200)				
9Aw	Vocational Orientation Laboratory				
	Sec. 1	II	TTh	306AWeH	} Mr. Brayfield
	2	III	TTh	306AWeH	
9As	Vocational Orientation Laboratory				
	Sec. 1	I	TTh	306AWeH	} Mr. Brayfield
	2	II	TTh	306AWeH	
	(Each section limited to 35)				
10Af‡-10Bw-10Cs	Human Biology .....				
	Sec. 1	V	MWF	201WeH	} Dr. Potthoff
	2	VI	MWF	201WeH	
10Aw‡-10B	Human Biology .....	III	MWF	201WeH	
	(Each section limited to 200)				
11Af-11Bw-11Cs	Basic Wealth .....	II	MWF	101WeH	Mr. Kernkamp, Mr. Wilcox, Mr. Peters
14As	Food Selection and Purchase.....	VI	MWF	206WeH	Ar
15Aw	Clothing Selection, Purchase, and Care .....	VII	MTWF	206WeH	Miss Brew
16Af	Selecting and Maintaining a Home .....	VI	MWF	206WeH	Miss Goldstein
16Bw	Renting, Buying, or Building a Home .....	III†	MW	206WeH	Mr. Jones
17Af	Maintenance Aspects of Family Life .....	II	MWF	206WeH	Miss Holmstrom
17Aw	Maintenance Aspects of Family Life .....	VI	MWF	206WeH	Miss Holmstrom

‡ A fee of \$1 is charged for this course.

SCHEDULE

No.	Title	Hour	Day	Bldg.	Instructor
17Bs	Income Management, Individual and Household Buying ..... (Each section limited to 100)	II	MW	206WeH	Miss Kafka
21Af-21Bw-21Cs	General Arts .....				
	Sec. 1 .....	I	TTh	201WeH	} Mr. Hill
	2 .....	VI	TTh	206WeH	
	(1 hr. discussion to be arranged) (Limited to 100)				
22Af-22Bw-22Cs†	Art Today .....				
	Lecture .....	II	TTh	206WeH	}
	Discussion .....	I-II	F	301WeH	
23Af-23Bw-23Cs†	Art Laboratory.....				} Miss Fisher
	Lecture .....	IV	T	202WeH	
	Laboratory Sec. 1 .....	II-III	TTh	301WeH	
	2 .....	VI-VII	TTh	301WeH	
	(Each laboratory section limited to 30)				
24Af-24Bw-24Cs†	Music Today .....				
	Sec. 1 .....	II-III	TTh	202WeH	} Mr. Hill
	2 .....	VII-VIII	MW	202WeH	
	(Each section limited to 60)				
25Bw-25Cs†	Film and Drama—Sections 1 and 2 .....	VIII-IX	Th	MNHAud	} Mr. Hamilton
	Discussion Sec. 1 .....	IV	T	206WeH	
	2 .....	VI	T	206WeH	
	3 .....	VIII	T	206WeH	
	(Each discussion section limited to 50) (The class meeting Thursday afternoon is in conjunction with the Visual Education Service Department's regular showing of especially selected films for university students.)				
29As	Reading Skills .....	III	TTh	302WeH	Mr. Appel
	(Each section limited to 40)				
30Af-30Bw	Literature Today .....				
	(fall) .....	IV	MWF	101WeH	} Mr. Appel, Miss Kranhold
	(winter) .....	IV	MWF	201WeH	
30Bf-30Aw	Literature Today .....	VII	MWF	201WeH	
	(30B limited to 150)				
31Af	Writing Laboratory .....				
	Sec. 1 .....	I	M	302WeH	} Mr. Appel, Miss Kranhold, Mr. Featherstone
		I-II	F	302WeH	
		I	W	202WeH	
	2 .....	II	M	302WeH	
		I-II	W	302WeH	
		II	F	306AWeH	
	3 .....	III	M	302WeH	
		III-IV	F	302WeH	
		III	W	202WeH	
	4 .....	IV	M	302WeH	
		III-IV	W	302WeH	
		IV	F	306AWeH	
	5 .....	VI	MF	302WeH	
		VI-VII	W	302WeH	
	6 .....	VIII	MW	302WeH	
		VII-VIII	F	302WeH	
31Bf	Writing Laboratory .....				
	Sec. 7 .....	VI	T	302WeH	
		VI-VII	Th	302WeH	
31Cf	Writing Laboratory .....				
	Sec. 8 .....	II	T	302WeH	
		II-III	Th	302WeH	

† A fee of \$1.50 per quarter is charged for this course.

## GENERAL COLLEGE OF THE UNIVERSITY

No.	Title	Hour	Day	Bldg.	Instructor		
31Aw	Writing Laboratory Sec. 1	II	M	302WeH	} Mr. Appel, Miss Kranhold, Mr. Featherstone		
		I-II	F	302WeH			
	2	II	W	202WeH			
		IV	MW	302WeH			
	3	III-IV	F	302WeH			
		VIII	MW	302WeH			
31Bw	Writing Laboratory Sec. 4	VII-VIII	F	302WeH			
		I	M	302WeH			
	I-II	W	302WeH				
	5	VI	M	302WeH			
	6	VI-VII	W	302WeH			
		I	T	302WeH			
	7	I-II	Th	302WeH			
31Cw	Writing Laboratory Sec. 8	VI	T	302WeH			
		VI-VII	Th	302WeH			
31As	Writing Laboratory Sec. 1	III-IV	T	302WeH			
		III	Th	302WeH			
31Bs	Writing Laboratory Sec. 4	IV	M	302WeH	} Mr. Appel, Miss Kranhold, Mr. Featherstone		
		IV	W	202WeH			
	2	III-IV	F	302WeH			
		VI	MF	302WeH			
	3	VI-VII	W	302WeH			
		VIII	MW	302WeH			
31Cs	Writing Laboratory Sec. 6	VII-VIII	F	302WeH			
		II	M	302WeH			
	I-II	W	302WeH				
	5	III	M	302WeH			
	31Cs	Writing Laboratory Sec. 6	III-IV	W		302WeH	
I			M	302WeH			
I-II			F	302WeH			
I			T	302WeH			
32Af-32Bw-32Cs‡	Speech Laboratory Sec. 1	I-II	TTh	302WeH			
		VI	T	302WeH			
	2	I-II	TTh	302WeH			
		VI	T	302WeH			
		VI-VII	TTh	302WeH			
32Af-32Bw-32Cs‡	Speech Laboratory Sec. 1	II	MW	306AWeH	} Mr. Dusenbury		
		2	III	MW		306AWeH	
		3	IV	MW		306AWeH	
		4	V	TTh		306AWeH	
		5	VII	TTh		306AWeH	
33Af-33Bw-33Cs‡	Speech Studio Sec. 1	I	MW	306AWeH			
		2	VI	TTh		306AWeH	
37Af-37Bw-37Cs	Physical Science	I	MTWThF	150Phys		Mr. Vaughan, Mr. Hardy	
38Aw-38Bs	Consumer Relations of Physical Science	III	TTh	206WeH		Mr. Vaughan	
41A-41Bf	Practical Applications of Psychology	(Limited to 100)	1:00-2:20	MWF		206Pt	Mr. Carlson, Mr. Longstaff
41Aw-41Bs	Practical Applications of Psychology	(Limited to 225)	II	MWF		201WeH	Mr. Longstaff

‡ A fee of \$1.50 per quarter is charged for this course.



SCHEDULE

No.	Title	Hour	Day	Bldg.	Instructor
42Af-42Bw	Human Development and Personal Adjustment .....	I	MWF	201WeH	Mr. Harris
42Aw-42Bs	Human Development and Personal Adjustment .....	III	MWF	101WeH	Mr. Anderson
45Af-45Bw-45Cs	The United States in World Civilization .....	III	TTh	101WeH	Miss Ylvisaker
	(Limited to 150)				
46Af-46Bw-46Cs	Government Studies .....	VI	MWF	101WeH	Mr. Kirkpatrick, Mr. Christensen, Mr. Mills
	(Limited to 250)				
47Af,w,s	Social Science Laboratory .....	VII-VIII	TTh	202WeH	Mr. Wilson, Miss Ylvisaker
	(Limited to 40)				
48Aw-48Bs	Our Economic Life .....	VII	MW	101WeH	Miss Canoyer
	(Limited to 150)	and 1 discussion hr.			
	Discussion Sec. 1 (w)	VI	F	302WeH	
	1 (s)	VI	F	Ar	
	2 (w,s)	VII	F	101WeH	
	(Each discussion section limited to 75)				
49Af	Formation of Public Opinion.....	IV	MWF	308MurH	Mr. Ford
55Af,w,s	Individual Study and Research.....	Ar	Ar	Ar	G. C. faculty
56Af-56Bw	Home Landscaping .....	VIII	MWF	4Bo	Mr. Phillips
	(Limited to 40)	1 hr. lab. ar.			
57Aw	Indoor Gardening .....	VIII	TTh	4Bo	Mr. Phillips
	(Limited to 40)				
57Bs	Home Gardening .....	VIII	MWF	4Bo	Mr. Phillips
	(Limited to 40)	1 hr. lab. ar.			
58Af-58Bw-58Cs	Introduction to the Mathematics of Business .....	IV	MWF	166Ph	Miss Thorp
	(Limited to 135)				
59Aw	Introduction to Philosophy.....	IV	MWF	206WeH	Mr. Everett
	(Limited to 100)				
60Af,s	Straight and Crooked Thinking	III	TTh	306AWeH	Miss Shaw
	(Limited to 25)				
61Af	Survey of Recreation Activities	VII	MWF	206CH	Mr. Haislet

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*Learn for Living*



*The Bulletin of the*  
**UNIVERSITY of MINNESOTA**

EXTENSION CLASSES

1941-42

## CALENDAR

1941			
September	15	Monday	Registration, first semester, begins
September	29	Monday	Classes begin
October	4	Saturday	Last day for registration without extra fee
November	24	Monday	Midsemester grades due
December	20	Saturday	Christmas recess begins
1942			
January	5	Monday	Classes resumed
January	26	Monday	Registration, second semester, begins
February	2-6		Examinations, first semester
February	7	Saturday	First semester closes
February	9	Monday	Second semester classes begin
February	14	Saturday	Last day for registration without extra fee
April	6	Monday	Midsemester grades due
June	1-5		Examinations, second semester
June	5	Friday	Second semester closes
June	7	Sunday	Baccalaureate service
June	13	Saturday	Commencement exercises

## WHERE TO REGISTER

Minneapolis: (Campus)	402 Administration Building, University of Minnesota, Main 8177, Richard R. Price, Director
Minneapolis: (Downtown)	690 Northwestern Bank Building, Marquette Ave. and Sixth St. South, Main 0624, A. H. Speer, Resident Manager
St. Paul:	500 Robert St., Extension Center, Cedar 6175, C. H. Dow, Resident Manager
Duluth:	504 Alworth Building, Melrose 7900, John L. Macleod, Resident Manager

The Administration Building on the University campus may be reached by going two blocks north on Church Street from the Washington Avenue car line, or three blocks south on 17th Avenue S.E., from the Oak-Harriet car line.

## OFFICE HOURS

From September 22 to October 4, and from February 2 to 14, 8:30 a.m. to 8:30 p.m., including Saturdays.

At other times, 8:30 a.m. to 5:00 p.m.; Saturday, to 12:00 noon.

From September 15 to March 1 the campus office will be open from 8:30 a.m. to 8:30 p.m., except on Saturday.

## REGISTRATION TIME

All registrations should be made and fees paid before the first week of each semester. Registrations made later than Saturday, October 4, for the first semester, and Saturday, February 14, for the second semester, are subject to a late registration fee.

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Volume XLIV

Number 51

August 12, 1941

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minn. Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 12, 1918.

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The cover picture is by Harriet Heenan, who will teach the new extension class, Cameracraft.

# EXTENSION CLASSES

UNIVERSITY OF MINNESOTA  
1941-42

First Semester  
September 29 to February 7

Second Semester  
February 9 to June 5

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## FOREWORD

This program and schedule of extension classes is presented to the public of the Twin City area by the General Extension Division for the academic year 1941-42. Classes in addition to those listed herein may be authorized on petition.

These university courses, made available at times and places convenient for adults who can attend on a spare-time basis only, are set up with two objectives in view: (1) to provide those standard educational offerings which experience shows are normally in demand among the adults of this area and (2) to supply a limited number of more specialized or technical courses, immediately applicable to the present vocational situation and to the national defense program. There are available also the usual number of classes in avocational or recreational subjects.

Prospective students are urged not to permit the uncertainties and anxieties of the national emergency or the instability of their own prospects to thwart their educational plans. Regardless of public events, education must go on. The highest educational authority urges that men and women stick to their educational programs unless or until they are officially called to specific duty elsewhere. Education is one valid form of national defense.

*Richard R. Price*

Director

## INTERESTING NEW CLASSES

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# HOW TO STUDY

## AN INSTITUTE

The General Extension Division takes pleasure in inviting registered students, and those who are about to register, to attend, without charge, an institute on how to study expertly. The institute is offered in the belief that practically all students may find here and there suggestions that will help them to be more efficient in their study habits.

Charles Bird, professor of psychology, will be in charge of the institute. Meetings will be an hour and forty minutes in length, the first half for lectures by the instructor and the second for questions and discussion designed to clear up difficulties. The lectures will cover the following topics:

1. **ADULT LEARNING.** A brief survey of the relation between age and learning. The importance of proper motivation and effective incentives.

2. **BASIC FORMS OF SKILL.** Importance of reading and vocabulary. Problems of concentration. Need for equating ambitions and abilities. Suggestions for fostering these forms of skill.

3. **TEXTBOOK ASSIGNMENTS.** Self-recitation methods applied to various types of courses. Useful and useless outlines.

4. **NOTES AND EXAMINATIONS.** Taking lecture notes and preparing for various types of examinations.

5. **DISTRIBUTION OF STUDY.** Importance of avoiding fatigue. Cramming as a useful, supplementary aid versus cramming as a substitute for spaced learning. Practical applications of mental hygiene for the extension student.

	<i>First Semester</i>	<i>Second Semester</i>
<b>Dates:</b>	September 22-26	February 2-6
<b>Evenings:</b>	Monday to Friday	Monday to Friday
<b>Hour:</b>	7:00 to 8:40 p.m.	7:00 to 8:40 p.m.
<b>Place:</b>	Auditorium of Museum of Natural History Campus	Auditorium of Museum of Natural History Campus



# HOW TO READ RAPIDLY AND WELL

## A CLASS

Ability to read rapidly and well is more than an agreeable social accomplishment; it is a necessity. Many people are seriously handicapped in business, professional, and social life by their inability to read with speed and comprehension. Many others are unaware of the pleasure and profit that come from extensive reading of good books and magazines. Work in this class is designed to improve the student's reading ability. During the class periods, students' reading problems will be analyzed, their weaknesses in reading corrected, and their acquaintance with a wide variety of reading materials broadened. This is a noncredit class; fee, \$10. There are no prerequisites.

### **First Semester**

Wednesday, 6:20 Campus Folwell 113, Handlan

# INFORMATION

## SUMMARIZED FACTS ABOUT EXTENSION CLASSES

**How To Read Class Descriptions.**—Here is a typical class description:

**B.A.152-153† Cost Accounting.** 3 credits each semester. \$10.

Principles used to determine the profitableness of each branch of manufacturing, and basis for judging the relative efficiencies of operation; materials, labor and burden; continuous process and production order costs; burden distribution methods, standard costs, etc. Prerequisite: Econ. 25L or equivalent.

**First Semester**  
152 W 6:20 St. P. Ext. Center 216,  
Tuttle

**Second Semester**  
153 W 6:20 St. P. Ext. Center 216,  
Tuttle

The **numbers** and **names** of extension classes are usually the same as those of corresponding day classes. Sometimes the letters **ex** follow the class number; this means either that there is no corresponding day class or that the extension class is a material modification of the corresponding day class for extension purposes. Capital letters preceding the class numbers refer to university divisions and departments; B.A. means Business Administration, G.C. means General College, ArtEd. means Art Education, M.E. means Mechanical Engineering, etc.

The **dagger** (†) means that both B.A. 152 and B.A. 153 must be taken before credit is given for either. When a class runs through two semesters, as does B.A. 152-153, the second semester is a continuation rather than a repetition of the first semester unless otherwise indicated.

The name of the class is followed by the **credits** which the class carries. Unless these credits are stated to be valid for a certificate, they are understood to be valid toward a university degree.

Then comes mention of the **tuition fee** (here, \$10) and of any **special fee** which may be involved. All fees are for one semester unless otherwise indicated.

**Prerequisites** refer to other classes which should precede the class in question. Extension students may ordinarily disregard these prerequisites but must make them up in order to become eligible for a degree.

The **time** and **place** of meeting of classes are indicated by abbreviations which in most cases will be obvious. For example, "W 6:20 St.P. Ext. Center 216" means that the class will meet on Wednesday at 6:20 in the St. Paul Extension Center, room 216. The **instructor's name** follows the room number.

**When Classes Meet.**—Most extension classes meet at 6:20 p.m. or 8:05 p.m. and run from 6:20 to 8:00 or from 8:05 to 9:45. This enables a student to attend two classes the same evening. The typical class is an hour and forty minutes in length. Five-credit classes meet for two hours and forty-five minutes. There are a few one-hour classes.

The typical class meets once a week for seventeen weeks, the last meeting being devoted to the examination. Exceptional classes, which meet for fewer or more weeks, or twice a week, are indicated in their descriptions.

Extension classes meet regularly for the entire semester without regard to **holidays**, except for the Christmas recess. For this recess, classes will be suspended Saturday, December 20, and will resume on Monday, January 5. Classes whose meetings fall on any holiday may, by agreement between students and instructors, be dismissed, but such meetings are made up by extra meetings before the close of the semester in which they occur.

**Where Classes Meet.**—Classes meet in designated buildings on the Main or Farm campuses of the University or in places chosen for convenience in downtown Minneapolis and St. Paul. A map of the Main campus, showing location of university buildings, will be found inside the back cover of this bulletin.

**Instructors and Classes.**—The assignment of instructors announced in this bulletin is made in good faith but the University reserves the right to change these assignments if necessary. The University also reserves the right to cancel any class whose enrolment is insufficient to warrant its continuation; 15 is the normal minimum enrolment.

**Classes Not Listed in This Bulletin.**—Extension classes will be conducted in any available subject on petition of a sufficient number of students. The exact number will depend on the subject and the conditions of offering, and will be determined on application. Such a petition may be made to any office of the division, and should be accompanied by the name and address of each petitioner, so that notice may be given if the class is organized.

## REGISTRATION

Students may register in person or by mail.

**1. Registration in Person.**—Those desiring to register in person may apply at any one of the offices during the office hours listed inside the front cover. Students registering for the first time are advised to register in person in order that they may be assisted or advised by those in attendance.

**2. Registration by Mail.**—Those desiring to register by mail should make application (by mail, telephone, or in person) to the campus office of the General Extension Division for the extension class bulletin and a registration form. The completed registration form and fees may then be mailed (do not send currency by mail; use check or money order) to the main office of the General Extension Division, 402 Administration Building, University of Minnesota, Minneapolis. No registration will be accepted unless it is accompanied by payment of fees. The receipted fee statement will be returned to the student by mail.

**3. Registration Dates.**—First semester: September 15 to October 4; second semester: January 26 to February 14. After these dates, registrations will be accepted only on terms stated in the next paragraph.

**4. Late Registration.**—Students are expected to register during or before the first week of classes. They are permitted to register up to, and including, Saturday of the third week of either semester but for this privilege a late registration fee is charged; see page 7. After the third week of a semester, students may register for a credit class only with the approval of the Students' Work Committee.

*N.B.—Registration sent by mail and postmarked later than midnight of October 4 for the first semester, and February 14, second semester, will be subject to the late registration fee and will be held up until the fee is paid.*

**5. Fee Receipt.**—The student should carry his receipted fee statement with him and be prepared to show it to the instructor as evidence of his registration.

**6. Transfer.**—A student who desires to transfer from one class to another may do so, without charge, by applying to the main office of the General Extension Division. After the third week of a semester, transfers involving credit classes may be made only with the approval of the Students' Work Committee.

**7. Cancellation.**—A student who drops out of class should have his registration officially cancelled by application to the main office of the General Extension Division to avoid having a low mark recorded against him. For refunds see page 7.

**8. Advice.**—The Students' Work Committee of the General Extension Division is ready to give information and advice. Students registering for the first time may learn what classes are most appropriate for them, in view of their preparation and aims. Those planning to work for a certificate or degree may save themselves mistakes in choosing classes which do not count in their programs. Those who have accumulated a number of credits may be advised about what certificate or degree to work for, and what classes to choose. Credits may be submitted for evaluation and the determination of advanced standing. Consultations may be had any time either by telephone or by personal interview. Students who wish to make most effective use of their study should not neglect to check their work with the committee.

Extension students may avail themselves of the services of the University Testing Bureau. The charge of \$4 for these services includes both testing and counseling.

## FEES

**All checks should be drawn for the exact amount due, and made payable to the University of Minnesota.**

**1. Tuition Fee.**—The usual tuition fee for the typical extension class (17 regular sessions, 3 credits) is \$10; fees for other classes are based on this standard fee and are indicated in the class descriptions. Tuition fees do not include texts or materials, and are the same for auditors as for credit students.

**2. Laboratory Fee.**—Charges for materials or service are made in connection with certain classes. In most cases these fees are payable with the tuition, but in classes in chemistry at the Chemistry Department.

**3. Materials Fee.**—In some classes materials are furnished, usually in place of textbooks. A minimum charge is made for this service, payable at the time of registration.

**4. Late Registration Fee.**—For registrations made from Monday, October 6, to Saturday, October 11, for the first semester, and from Monday, February 16, to Saturday, February 21, for the second semester, the late registration fee is one dollar (\$1). Dates are inclusive. After these periods the late registration fee is two dollars (\$2). The late registration fee applies to each class for which the student registers.

**5. Athletic Facilities Fee.**—See pages 13-15.

**6. Special Fees for Examinations.**—For the removal of a grade of Condition, an examination is given for which the fee is \$1, payable before the examination. For special examinations for credit for work done elsewhere a fee of \$5 is charged.

**7. Refunds.**—A student who cancels his registration before the ninth week of a semester may obtain a pro-rata refund of the tuition fee, provided written notice is given any office of the General Extension Division at the time of cancellation. Two dollars (\$2) of each fee is nonrefundable, being withheld to cover registration expense. Remittance of refunds by mail requires a period of time, but immediate refunds may be had by making application in person on weekdays between 9:00 a.m. and 12:00 m., or 1:00 and 3:00 p.m. (except Saturdays) at the campus office of the General Extension Division. Refunds to holders of Student Season Athletic Books are subject to special provisions; see page 15.

*N.B.—Applications for refund because of cancellation must be made not later than November 22 for the first semester, or April 4 for the second semester. They will not be considered if made later.*

8. **Loan Fund.**—The General Extension Division has at its disposal a fund from which it can make loans for tuition to needy and worthy students. Prospective students who cannot pay tuition fees should make application to the director for assistance. Loans are open to students who have satisfactorily completed two semesters of study in this division.

## STUDENTS' WORK REGULATIONS

### The Students' Work Committee

This committee of the General Extension Division has direct supervision of the work done by students of the division. It offers information about the sequence of courses, certificates, relation of extension classes to the work of other colleges, credits presented from other colleges, the organization of a program of study, and other similar matters. For candidates for degrees it offers its services in securing the advice and direction of the proper officials of the college concerned, who alone can give authoritative information.

Appointments with the committee may be made at any time by application at any office of the General Extension Division. Under ordinary circumstances these conferences should be held during usual business hours which are extended to the evening during registration periods; at other times special appointments may be made as necessary.

### Admission to Extension Classes

In keeping with the philosophy of adult education, extension classes are open to all persons who can profitably pursue them. The only requirements, therefore, are sufficient maturity and ability to study successfully the work undertaken—of which the instructor will be the judge.

**Prerequisites** may be disregarded by students who are not working for a degree. Students working for degrees may temporarily disregard prerequisites but must make them up in order to become eligible for a degree.

No student regularly registered for day class work in any unit of the University may register for extension classes without the approval of the dean of his unit, nor may a student who has been dropped by any unit of the University register for extension classes until he has been readmitted to his unit.

### Credits

Extension classes are designated in their descriptions as carrying credit, credit for certificate, or no credit. The credit classes may be applied toward a university degree whenever a student becomes properly registered in one of the colleges of the University and has met the prerequisites of the classes involved. Noncredit and certificate-credit classes should not be regarded as less worth while than credit classes; the reason they do not carry university credit is that there are no corresponding day classes in the University.

Classes in Education (designated ArtEd., Ed.C.I., Ed.Psy., etc.) ordinarily carry credit only in the College of Education. They may, however, be applied toward extension certificates when properly approved.

General College classes (designated G.C.) do not carry credit which is directly transferable to other colleges. Progress for transfer purposes and toward a degree in the General College is determined by the completion of preparation for, and the passing of, comprehensive examinations which cover certain broad areas. General College classes may, however, be applied toward extension certificates when properly approved.

1. **Credits Earned Elsewhere.**—This University accepts credits earned at any accredited college, university, state teachers college, or junior college in so far as such credits represent courses equivalent to those offered in this University. Work done at nonaccredited institutions will be accepted only upon satisfactory completion of a comprehensive examination for each course presented, and in limited amount. Students desiring to present credits earned elsewhere should consult the Students' Work Committee through which arrangements will be made either for the evaluation of credentials or for special examinations.

2. **Auditors.**—Students who do not want to do all the required work of a class can assume the status of auditor by filling out an auditor's form. They are encouraged to do as much of the work of the class as they can, but may not receive credit for the class. A student may change from credit status to auditor's status any time before the date of the final examination; a student may change from auditor's status to credit status only with the approval of the Students' Work Committee. Auditors pay the same fees as other students.

3. **Amount of Credit.**—Classes meeting for two hours once a week for a full semester normally carry 3 quarter credits. Classes meeting oftener than once a week, or for more or less than the two-hour period, carry corresponding credit based upon their relation to the normal three-credit class. Such variations are indicated in class descriptions.

4. **Normal Load.**—The maximum amount of extension work (including both extension classes and correspondence study courses) to be carried by students regularly employed is 9 or 10 credit hours, the equivalent of three 3-credit or two 5-credit classes, per semester. Permission to exceed this maximum may be obtained only from the Students' Work Committee.

5. **Residence Credit.**—Attendance in extension classes in Minneapolis, St. Paul, and Duluth meets the requirements of residence at the University; that is, such attendance may be counted in fulfilling the requirement of time spent in residence study, as prescribed for various degrees by the University or by the separate colleges. (This does not apply to extension classes outside the three cities named, nor to correspondence study.)

6. **Graduate Credit.**—Under the regulation of the Graduate School, credits earned in extension classes may not regularly be counted toward a graduate degree.

*N.B.—For adjustments possible in the Graduate Course in Social Work, consult the Department of Sociology and Social Work.*

### Extension Certificates

For the completion of specified amounts of work, in definite fields, the General Extension Division awards certificates. The basis for these awards is the completion of 90 credits, of which at least 25 must have been earned at the University of Minnesota. Credits earned in other accredited institutions, as well as in the various colleges of the University of Minnesota, will be accepted to the extent that they meet certificate requirements. Credits earned by correspondence study in the University of Minnesota or in any other institution approved by the National University Extension Association, will be accepted for not more than 45 of the 90 credits required. All extension certificates require a C average. The following certificates are available:

**Junior College Certificate.**—Requirements for this certificate correspond to the requirements for the first two years of the work of the College of Science, Literature, and the Arts. These represent one half of the work for a Bachelor's degree, and consequently, all of the credits must conform to degree standards as to the subjects and classes involved, prerequisites, and correspondence to similar courses offered in day classes. In addition, a candidate for this certificate must have met university entrance requirements.

I. To obtain this certificate the student must earn 90 credits and must maintain a C average. To be acceptable toward this certificate, credits must be earned in classes belonging to the Junior College—that is, numbered below 50—save as exceptions are printed in the Combined Class Schedule (immediately under the "Senior College Courses" section of each department's classes) or obtained from the dean of the Junior College of the College of Science, Literature, and the Arts.

II. The following group requirements must be met:

1. English Composition 4-5-6 (9 credits) or English A-B-C (15 credits) or exemption from the requirement. All students desiring to register for these classes will take a placement test. (See pages 24-25.)
2. Foreign Language. A total of 20 credits (18 if in 3-credit units) in one foreign language. For every full year of such language taken in high school this requirement shall be reduced 5 credits. Students, for instance, who have had two years of a foreign language in high school may complete the requirement by earning 10 credits in that same language in nonduplicating college courses.
3. 10 credits (9 if in 3-credit units) in one of the social studies: anthropology, economics, geography, history, political science, sociology.
4. 10 credits (9 if in 3-credit units) in one of the natural sciences: astronomy, botany, chemistry, geology (including laboratory), physics, psychology (including laboratory), zoology.

In addition to these specified studies the student will include studies of his own choosing (electives) to make up the number of credits required (90).

III. In order that the student may be prepared on entering the Senior College to devote his time to Senior College studies, he should examine the prerequisites for the Senior College studies in the fields in which he is interested. By the end of his sophomore year he is expected to be prepared for Senior College studies in at least five departments. (For a complete list of these departmental requirements, see the Bulletin of the College of Science, Literature, and the Arts, or consult the Students' Work Committee.)

IV. Students who have, previous to September, 1934, begun work on these requirements under the provisions existing at that time may complete under those provisions.

V. These requirements may be modified to conform to the requirements for admission to specific schools and colleges of the University, such as the prebusiness, premedical, pre dental, or other requirements. Specific information regarding this will be given by the Students' Work Committee.

**Liberal Education Certificate.**—In contrast to the Junior College certificate this represents work that may be done without regard to any degree requirements, any particular sequence of classes, or prerequisites, except ability of the student to do the work of the class and to maintain a C average. The requirements are reduced to a minimum, that minimum being quite flexible; they are a requirement in English, a breadth or spread requirement, and a concentration requirement. The details are as follows:

1. English—9 credits in any classes for which student has preparation.
2. Spread—at least 6 credits in each of the three following fields: natural sciences (astronomy, botany, chemistry, geology, physics, psychology, zoology, or mathematics); social sciences (anthropology, economics, geography, history, political science, sociology); arts or humanities (fine arts, languages, philosophy, speech). Total 18 credits.
3. Concentration—at least 18 credits in one subject or in closely related subjects.
4. Electives—45 credits. To make a total of 90. All elections may be made regardless of college lines, as student interest dictates.

This certificate is recommended to those who are not interested in a college degree, but nevertheless wish to pursue their study with some sort of system and organization.

**Business Certificate.**—See page 57.

**Engineering Certificate.**—See page 71.

### Degrees

Students who wish to become candidates for a degree must meet the admission requirements of the University and the entrance and degree requirements of the college in which they wish to do their work. The Students' Work Committee will assist students in determining their status with regard to these requirements.

It is possible, as an increasingly large number of students are realizing, to complete a considerable portion of the requirements for a Bachelor's degree in extension classes. Theoretically all the work for a degree, including the curricular requirements and special demands, such as comprehensive final examinations, can be met through these classes. In practice, however, there are likely to be advanced course requirements in major subjects which cannot be offered in extension classes because of insufficient demand. In order that the student may make a practical program which will enable him to get the greatest benefit from his extension classes and reduce to a minimum the time that is spent in securing advanced courses in day classes, advice and assistance should be sought at the earliest possible moment.

### Examinations

Examinations in all classes are given during the last week of each semester. All students desiring credit must take these examinations.

Other examinations or quizzes are entirely at the option of the instructor. Examinations for the removal of the grade of Condition (E) will be given on application at a time and place agreed upon by the student and the instructor. A fee of one dollar (\$1), payable at any office of the General Extension Division, is charged for a condition examination.

Special examinations for credit for work done elsewhere will be arranged on application to the Students' Work Committee.

### Grades

Four grades, A, B, C, and D, are given for work of varying degrees of merit, D being the lowest passing grade. Work below passing is marked E, condition, or F, a failure. Work which is of at least D grade, but for acceptable reasons not complete, may be marked I, incomplete, provided not more than one fourth remains incomplete.

A **condition** is a temporary grade representing a deficiency which may be made up without repeating the course. It may be removed by additional work, by an examination, or by both. If not removed within two semesters following the resumption of the student's extension class work it becomes a failure. Pending such removal the student may register for a continuation class, indicated by a dagger (†), in a succeeding semester. The permanent grade resulting from the removal of a condition may not be higher than C.

A **failure** represents a deficiency so serious that the student must repeat the class in order to obtain credit in it. Following a failure the student will not be permitted to register for a continuation class.

**Incomplete work** may be completed in any way the instructor may prescribe and should have the student's earliest attention. If this is not done within two semesters following the resumption of the student's extension class work, the grade becomes a condition or a failure, as the instructor may elect, subject to the rules applying to those grades.



**Honor Points.**—In the General Extension Division honor points are employed only to ascertain whether a student has the C average required for all certificates; they are not employed to reduce the number of credits required for a certificate. Students in extension classes who are seeking degrees should consult an officer of the college in which a degree is sought regarding the status of honor points in that college.

**Grade Reports.**—Reports of students' grades are sent to the office of the university recorder at the close of each semester. A report of each student's grades and credits is sent to the student by the recorder, and will not be furnished by the office of the General Extension Division.

Instructors are required to report at each mid-semester all grades below D on the work so far completed. On the basis of these reports students are advised and counseled by the Students' Work Committee.

### Attendance

Attendance at every meeting of a class is expected; success in the work of a class is based on this attendance. Instructors are required to report continuous absences in order that the Students' Work Committee may inquire into the causes of absence and the student's intentions, may recommend what may be best for the student, and may determine the student's status. Such inquiry and recommendation is entirely in the interest of the student and in no sense disciplinary; extension students are considered to be in classes for very definite purposes, are competent to govern their comings and goings, and may be trusted to give the attendance necessary to the accomplishment of their purposes.

## SPECIAL OPPORTUNITIES AND FACILITIES

### The University Library

Extension students attending classes in Minneapolis or St. Paul are entitled to draw books from the University Library to be used in connection with their classes but are subject to all library regulations including those in regard to return upon demand and to fines on overdue books. These regulations are set forth in the *Library Handbook*, copies of which may be had at the loan desk.

### How To Study and How To Read

The division provides without charge a five-day How To Study Institute at the beginning of each semester, described in detail on page 3. Many students will also be interested in the class, How To Read Rapidly and Well, described on page 4.

### Guidance

Extension students are busy adults, making their living in a complex and demanding society. As such, they face not only educational problems but vocational and personal problems as well. Advice is available to extension students through three sources: instructors, the Students' Work Committee, and the University Testing Bureau. The Testing Bureau invites extension students to make use of its facilities. The fee of \$4 includes not only complete testing services but expert counseling as well. Arrangements for testing and counseling can be made at the bureau's offices in Eddy Hall on the campus, Main 8177, Ext. 585, or through the Students' Work Committee, Ext. 244.

### The Minnesota Daily

Extension students may subscribe for the *Minnesota Daily*, student newspaper, at the regular mailing rates; these are \$3.50 for the school year, or \$1.25 per quarter, payable in advance. Application should be made to the business manager of the *Daily*, Murphy Hall.

### Music

**Minneapolis Symphony Orchestra.**—The Orchestral Association makes a special rate for season tickets to the regular concert season, applying to students who are registered for five credits or more. Receipted fee statements will be considered evidence of registration and will be stamped when tickets are purchased.

**University Symphony Orchestra and University Chorus.**—Participation in these university musical organizations is open to qualified extension students, on terms outlined on page 37.

**Classes.**—A wide selection of music classes is open to registration by extension students. For particulars, see pages 36-38.

### Art

**University Art Gallery.**—The gallery maintains an extensive collection of pictures which extension students may rent to hang in their homes. Interesting and varied exhibits are displayed from time to time in the gallery's quarters on the third floor of Northrop Auditorium.

**Art Classes.**—A varied group of art classes, described on pages 16-18, is open to registration by extension students.

### Activities of the Evening Students Association

The executive council of the Evening Students Association sponsors numerous extracurricular activities including dances, sports, bridge, music, and dramatics. Information about these activities may be had from class representatives and from the Students' Work Committee.

### Recreation Classes

For a wide variety of recreation classes open to registration by extension students, see pages 46-48.

### Athletic Facilities for Men

The university athletic facilities for men are open to extension students on the same basis as to full-time day students. The use of these facilities, by any student, requires the payment of fees listed below.

**Gymnasium.**—Open daily from 8:30 a.m. to 5:30 p.m.; during season of indoor sports, to 10:00 p.m. Fees: equipment \$1, towel \$1, and locker 25 cents, per quarter (11 weeks). A gymnasium or athletic uniform, exclusive of shoes, may be rented for a fee of \$1 per quarter. The student, of course, may provide his own uniform.

**Swimming Pool.**—Open daily, 11:30 a.m. to 10:00 p.m. Swimmers are asked to leave the pool between 9:30 and 9:45 in order to have time to dress before the building is closed. Fees: towel \$1 and locker 25 cents per quarter.

Fees are payable at the ticket office in the lobby of Cooke Hall—open daily until 5:30 p.m., except Saturday and Sunday. Students unable to reach

this office before 5:30 may remit a check to the Athletic Department for the services they wish. Locker and towel cards will then be left in care of the man in charge of the locker rooms, who is present until 10:00 p.m.

**Golf Course.**—Students who are registered for extension classes for the second semester, or after April 1, may play golf at the University of Minnesota Recreation Field. Identification cards must be procured in advance; they will be issued on presentation of receipted fee statement at the clubhouse on the Recreation Field. This can be done by mail.

### Athletic Facilities for Women

The facilities of the Women's Gymnasium are at the present time open only through the regularly scheduled extension classes which offer an extensive program for those who wish to avail themselves of it (see pages 46-48).

### Student Season Athletic Books

The student season athletic book admits to all intercollegiate athletic events, except swimming, during the college year. It is a privilege book and consequently the privilege may be denied to any student who violates any of the conditions under which the book is issued.

**Who May Purchase.**—Any student enrolled in any department of the University, including Graduate, Extension, etc., whether regular or special, and carrying a minimum scholastic load of five quarter credits, or classes carrying a corresponding fee, who presents a receipted fee statement at the time of sale, covering a course of study running concurrent with the time for which the book is issued, is entitled to purchase one book if single, or two if married. **Students in correspondence study courses are not eligible to this privilege.**

The privilege books must be exchanged the first week in January for new privilege books, covering the winter and spring sports schedule. This exchange will not be made unless a receipted fee statement for the winter quarter or second semester is presented, except that extension students may make this exchange without a fee statement by paying a \$2 transfer fee per ticket, and thus obtain the privilege books for the winter and spring schedules. **This transfer fee will be applied to the registration fee for the second semester if the extension student enrolls for the second semester.** If the student fails to enroll for the **second semester of the same academic year**, the exchange ticket may be used for all remaining winter and spring sports, but the transfer fee will be retained by the Department of Athletics.

**The price of the student book is \$7. Checks are not accepted in payment.**

**Where Purchased.**—Books may be purchased at the Minneapolis or St. Paul offices of the Extension Division during the week before the beginning of classes. Extension students are expected to make their purchases through the office where they register. They must appear in person with fee statement. If the student is buying an additional book for husband or wife, the husband or wife must also be present at the time for the purpose of photographic identification.

**Seat Location.**—At football games the seat location will be in the student section. The Ticket Committee of the university faculty has the following regulation regarding the allocation of this section:

"The assignment of seats to students shall begin with the line between sections 5 and 6 and run east. Students shall be seated by classes in the following order: (1) seniors and graduate students, (2) juniors, (3) sophomores, (4) freshmen, (5) extension students."

This section is not open to nonstudents nor may students sit outside this section. Nonstudents will not be admitted to the student section at basketball games. For all other events the book admits to unreserved sections.

**Cancellation of Registration, Refunds.**—The student season book is a privilege extended to students only and it becomes void the moment an individual ceases to be a student in the University whether by cancellation of registration, expulsion, or in any other manner. The book is not transferable and cannot be resold, nor will the purchase price be refunded after the book has been used for any event except in cases where the student is required, by the University, to cancel his registration.

When an extension student holding a book seeks a refund following cancellation, the book must be submitted with the application for refund. An adjustment of charges as between regular ticket rates and the season book rate will be made, and the balance of the season book charge refunded.

### **Correspondence Study**

The Correspondence Study Department of the General Extension Division offers students an opportunity to study at home by mail. Many students, for reasons of convenience, preference, or the availability of courses not included in extension class offerings, find correspondence study a valuable adjunct to their extension class work. Ask for a bulletin of correspondence study courses.

## GENERAL CLASSES

### AGRICULTURE

See page 65.

### ANATOMY

**5-6 General Human Anatomy.** 4 credits each semester. \$13.50.

Lectures and demonstrations dealing with the gross anatomy, histology, embryology, and physical growth of the system of the body. Anatomy 5 deals with cells, tissues, skeletal, muscular, and nervous systems; no prerequisite but Zool. 1-2 is recommended for preliminary study. Anatomy 6 deals with circulatory, respiratory, digestive, urogenital, and endocrine systems, together with a brief consideration of regional anatomy; prerequisite: Anat. 5.

**First Semester**

5 MW 7:30 Campus Anatomy 301,  
Noback

**Second Semester**

6 MW 7:30 Campus Anatomy 301, Hegre

**The Human Body in Health and Disease.** See pages 45-46.

**The Human Body in Operation.** See page 45.

### ANTHROPOLOGY

**42 The Growth of Human Cultures.** 3 credits. \$10.

Man's first appearance in the Old and New World; earliest stages in the development of civilization; discovery and invention, the formation of cultural patterns, and the spread and adaptation of culture to various environments in Asia, Africa, the South Seas, and among the American Indians; changes in the arts, beliefs, and institutions of primitive communities as observed in recent times. Prerequisite: 10 credits in science or social science.

**First Semester**

Th 8:05 Campus Wesbrook 6, Cline

**National Parks of the West.** See page 38.

### ART

**G.C. 21A-21B General Arts.** 3 credits each semester in General College. \$10.

Has it ever occurred to you that all the arts—music, painting, sculpture, the movies, architecture, the ballet, the graphic processes, the drama, literature, interior architecture, landscape architecture, industrial and commercial design—have a common basis in their purpose, a common basis in the solution of their formal problems, and differ only in the minor factor of their materials and processes?

General Arts is a course in applied esthetics and is designed to introduce the student to all the arts. It attempts to orient the student so that his further studies or experiences in any of the arts will be more sound, more vital, more enjoyable. It is hoped that the student will leave the course with the feeling that he has a basic and general footing in the arts which will serve in his everyday life. The material is presented by the lecture-laboratory method so that the important facts and principles are correctly illustrated. No prerequisite.

**First Semester**

21A T 6:20 Campus Wesbrook 202,  
Hill and assistants

**Second Semester**

21B T 6:20 Campus Wesbrook 202,  
Hill and assistants

**G.C. 22A-22B Painting, Sculpture, and Architecture.** 3 credits each semester in General College. \$10.

This course corresponds to the Art Today course in the General College. The evening class will discuss the factors involved in building an appreciation and understanding of the painting, sculpture, and architecture of all the important periods in art history. This is not a history course, nor is it a course in a study of the materials and processes of art. It is a course which seeks to find the value of great paintings and sculpture. It attempts to show how great architecture, such as the Parthenon, Chartres, St. Peter's, Santa Sophia, are outgrowths of their times and have become landmarks in our thinking. This course does not teach art as a means of escape, but rather as a stimulating study into the principal art products of the world as expressions of human values. These products will be discussed in relation to their particular place in society, to their formal problems, and to the techniques and materials used. In connection with the lecture, there will be opportunity to use the facilities of the General College Art Laboratory in order to further an understanding of the materials and techniques. The lectures will be illustrated by actual art products, field trips, slides, and movies.

**First Semester**

22A Th 6:20 Campus Westbrook 306,  
Fisher

**Second Semester**

22B Th 6:20 Campus Westbrook 306,  
Fisher

**Gardening.** See pages 28-29.

**Housing.** See page 34.

**Interior Decorating.** See page 35.

**Textiles.** See pages 54-55.

**ArtEd. 1 Fundamental Experiences in Design.** 3 credits. \$10.

The fundamental principles applied to a series of interesting and practical problems using a variety of techniques. A basic course that is useful in other fields of art and of value to teachers. No prerequisite.

**First Semester**

M 8:05 Campus Jones 203, Lewis

**ArtEd. 4-5-6 Drawing from Still Life and Pose.** 3 credits each semester. \$10 plus \$1 model fee, payable to instructor.

Drawing from objects and models, with emphasis on developing ability to do quick sketches. Especially planned to meet the needs of public school teachers. Includes ArtEd. 4-5-6, 7-8-9, 24-25-26; students may register for any three of these in any semester provided they are taken in sequence. No prerequisite.

**First Semester**

T 6:20 Campus Jones 207, Lewis

**Second Semester**

T 6:20 Campus Jones 207, Lewis

**ArtEd. 61-62-63 Figure Drawing and Painting.** Not offered 1941-42.

**Life Drawing and Painting.** 1½-3 credits each semester. \$10.

Drawing and painting from life; figure composition; pencil, pen, charcoal, oil pastels, and water colors; print making. Amount of credit to be arranged with instructor. Open to beginners and advanced students either semester. No prerequisite.

**First Semester**

W 7:30 Campus Main Eng. 417, Burton

**Second Semester**

W 7:30 Campus Main Eng. 417, Burton

**Freehand Drawing.** 1½ credits each semester. \$10.

Theory and practice of freehand drawing. Deals with perspective, design, and composition. Drawing of geometric solids and ornaments in charcoal, pencil, pen and ink, water color, or other media. Open to beginners and advanced students either semester. No prerequisite.

**First Semester**

T 7:30 Campus Main Eng. 417, Doseff

**Second Semester**

T 7:30 Campus Main Eng. 417, Doseff

**Commercial Drawing.** 3 credits each semester for certificate. \$10.

Elementary and advanced commercial art; design, lettering, layouts, posters in pen and ink, pencil, color, or other media. Solutions of practical problems stressed. Special attention given to fashion drawing and design. Open to beginners and advanced students either semester. No prerequisite.

**First Semester**

M 7:30 Campus Main Eng. 417, Doseff

**Second Semester**

M 7:30 Campus Main Eng. 417, Doseff

**Cartooning.** No credit. \$10.

Covers drawing technique and use of various materials. Body poses and backgrounds are analyzed; lettering and engraving requirements are studied. Titles and "gags" are given attention, as are such special types of cartoons as the political cartoon and motion picture animation. Career problems such as free lancing and selling are discussed. Opportunity to study originals of all leading comic strips, sports cartoons, editorial cartoons, Sunday color pages, and magazine cartoons. Open to beginners and advanced students either semester. No prerequisite.

**First Semester**

T 8:05 St. P. Ext. Center 220, Kleis

W 8:05 Campus Jones 203, Kleis

**Second Semester**

T 8:05 St. P. Ext. Center 220, Kleis

W 8:05 Campus Jones 203, Kleis

**Architectural Drafting.** No credit. \$10.

A class for home builders; not for the professional architect. Conventional methods of architectural presentation as used in house planning; detailing, perspective, and rendering, to suit individual needs. Repeated second semester. No prerequisite.

**First Semester**W 7:30 St. P. Mech. Arts High 103,  
Smalley**Second Semester**

Th 7:30 Campus Main Eng. 417, Smalley

**Engineering Drawing.** See page 74.**Ag.Eng. 42A-42B Art Metal Work.** 3 credits each semester. \$10.

Designed for persons interested in hobbies, for teachers of handicrafts and others interested in them. First semester: soft soldering; wooden hammer making; working in copper, brass, pewter, and aluminum; making trays, plates, bowls, candlesticks, etc.; etching; use of jeweler's saw in pierced work; wax and lacquer finishes. Second semester: enameling; silver soldering; chemical and heat coloring; making copper and silver spoons, bracelets, silver pendants and chains; projects in pewter, brass, and copper. Special attention to individual interests. Credit in College of Education. No previous experience or prerequisite necessary. Students may enter or continue in second semester.

**First Semester**42A W 6:20 Univ. Farm, Ag. Eng. 106,  
20, Dent**Second Semester**42B W 6:20 Univ. Farm, Ag. Eng. 106,  
20, Dent**Handicrafts.** 3 credits each semester. \$10.

Experience in simple handicrafts selected with reference to their recreational value, for those interested in camps, playgrounds, clubs, and adult education. First semester: pottery (hand building), metal and simple jewelry, bookbinding and portfolio making, basketry; second semester: pottery (pouring and wheel building), weaving (hand), woodblock and linoleum printing, stenciling (fabrics and paper), crayonnex, batik, woodcarving, leather tooling, and pressing and dyeing. Credit in College of Education. Students may enter or continue in second semester. No prerequisite.

**First Semester**

W 6:20 Campus Jones 10, Ross

**Second Semester**

W 6:20 Campus Jones 10, Ross

## ASTRONOMY

### 11 Descriptive Astronomy. 3 credits. \$10.

The general principles and fundamental facts of astronomy; illustrated by lantern slides, simple problems, and naked eye and telescopic observations. Higher mathematics not necessary. No prerequisite.

#### First Semester

W 6:20 Campus Physics 133, Luyten

### 13 Practical and Stellar Astronomy. 3 credits. \$10.

Supplements Astronomy 11, which, however, is not prerequisite; higher mathematics not necessary. A detailed description of the constellations and individual stars, the structure of the sidereal universe, and such problems as the determination of time from the stars; extended opportunity for the use of the telescope and the observation of the heavenly bodies.

#### Second Semester

W 6:20 Campus Physics 133, Luyten

## BACTERIOLOGY

### 53 General Bacteriology. 5 credits. \$17 plus \$2 laboratory fee.

Culture media; methods of staining and identification; principles of sterilization and disinfection; examination of air, water, milk; relation of bacteriology to the industries. Prerequisite: 10 credits in chemistry and 10 credits in biology.

#### First Semester

TTh 7:30 Campus Millard 214, Skinner

### 102 Special Bacteriology. 4 credits. \$13.50 plus \$2 laboratory fee.

The pathogenic bacteria, especially in relation to definite diseases; principles of infection and immunity. For technicians and others. Prerequisite: Bacteriology 53.

#### Second Semester

TTh 7:30 Campus Millard 214, Hoyt

### 103ex Soil Microbiology. Not offered 1941-42.

### 114 Yeasts, Molds, and Actinomycetes. Not offered 1941-42.

### 116 Immunity. 3 credits. \$10 plus \$2 laboratory fee.

General and special laboratory technique; immunological phenomena; preparation of vaccines; production and collection of immune sera; demonstrations of various immune substances; technique of forensic blood tests, the Wassermann test, modified Wassermann, and the Kahn test; allergy, anaphylaxis, atopy; blood grouping. Class limited to 25 students. Meets for one quarter, 11 weeks. Primarily for technicians; for prerequisite see instructor.

#### First Semester

MW 7:30 Campus Millard 214, Hoyt

### 121-122 Physiology of Bacteria. 5 credits. \$17.

The effect of environment on growth; enzymes; food requirements; carbohydrate, protein, and fat metabolism; products of growth; dormancy and death. Prerequisite: Bact. 53 and 8 credits in organic chemistry or biochemistry.

#### Second Semester

121-122 TTh 7:30 Campus Millard 201,  
Halvorson

### 152 Sanitary Bacteriology. 5 credits. \$17 plus \$2 laboratory fee.

A laboratory class in standard and approved methods for the bacteriological examination of water, milk, and foods; preparation and use of standard culture media; methods for standardization of germicides. Equivalent to Bact.



104 but more comprehensive; not open for credit to those who have taken 104. Prerequisite: Bacteriology 53.

**Second Semester**

MW 7:30 Campus Millard 201, Skinner

**BOTANY**

**1 General Botany. 4 credits. \$13.50.**

A survey lecture course on plants and their human interests, contributing to liberal culture; characteristics of living matter; fundamental facts of structure, growth, and reproduction; relation of plants to their environment and to each other; principles underlying inheritance, variation, plant breeding, and organic evolution. No prerequisite.

**First Semester**

M 6:20-8:30 Campus Botany Aud., Huff

**2 General Morphology of Plants. 3 credits. \$10.**

A laboratory course in evolution and classification of plants. Study of habits, structure, and reproduction of selected types of algae, fungi, liverworts, mosses, ferns, and seed plants. A general survey of the entire plant kingdom. Prerequisite: Bot. 1.

**Second Semester**

W 6:20 Campus Botany 1, Moore

**7 Taxonomy of Flowering Plants. Not offered 1941-42.**

**10ex Minnesota Plant Life. 3 credits. \$10.**

A study of our native wild flowers, trees, shrubs, ferns, liverworts, mosses, lichens, and mushrooms. A class for teachers, camp and scout leaders, and all who would know more of our native plants and their habits. No prerequisite.

**Second Semester**

M 6:20 Campus Botany 4, Huff

**21 Elementary Ecology. Not offered 1941-42.**

**Gardening.** See pages 28-29.

**BUSINESS**

See pages 57-70.

**CHEMISTRY**

**G.C. 37B Chemistry in Modern Life. 3 credits in General College. \$10.**

Today we depend upon a host of man-made applications of the sciences. In this multitude of modern conveniences and synthetic products we recognize the prime importance of chemistry. This series of lectures and demonstrations has been arranged to present in nontechnical language and on the demonstration table in front of us the many ramifications of the field of chemistry. A few lectures and demonstrations at the first of the semester will acquaint us with the elementary principles of chemistry and the meaning of a chemical reaction. Approximately two thirds of the semester will be devoted to the discussion and demonstration of such interesting topics as: chemistry and health, chemical aspects of air conditioning, soilless growth of plants, clothing and paper, modern plastics, vitamins, hormones, anesthetics and drugs, artificial rubber, nylon, sulfanilamide, regeneration of depleted soils, petroleum products, and other subjects of interest in the field. The general objective of the course is to trace the effect of man's knowledge of chemistry upon our lives and upon our economic welfare as a nation. No prerequisite but it will be of advantage to have had G.C. 37A, for which see page 41.

**Second Semester**

T 6:20 Campus Chemistry 215, Hardy

*N.B.—The following chemistry classes, except Advanced Quantitative Analysis, meet for a minimum of one lecture, one recitation, and three hours laboratory a week. Class periods: 7:30 to 10:00 p.m., both Tuesdays and Thursdays.*

**9ex‡ General Inorganic—Nonmetals.** 5 credits. \$17.

The common nonmetallic elements and their principal compounds; the laws and theories of chemistry. No prerequisite.

**First Semester**

TTh 7:30 Campus Chem. 315, 110, Geiger

**12ex‡ Qualitative Analysis.** 5 credits. \$17.

The laws, theories, and calculations involved; systematic qualitative analysis. Prerequisite: Chem. 9ex or its equivalent.

**Second Semester**

TTh 7:30 Campus Chem. 315, 110, Geiger

**1ex‡ Quantitative Analysis—Gravimetric.** 5 credits. \$17.

Principles and methods of gravimetric analysis; typical problems and proper laboratory practice. Prerequisite: Qualitative Analysis.

**First Semester**

TTh 7:30 Campus Chem. 310, 315, Geiger

**2ex‡ Quantitative Analysis—Volumetric.** 5 credits. \$17.

General principles and methods of volumetric analysis. Prerequisite: Qualitative Analysis.

**Second Semester**

TTh 7:30 Campus Chem. 310, 315, Geiger

**7ex‡ Quantitative Analysis—Premedical.** 4 credits. \$13.50.

Introductory, covering principles and methods of gravimetric and volumetric quantitative analysis; typical problems and proper laboratory practice. Prerequisite: Qualitative Analysis.

**Second Semester**

TTh 7:30 Campus Chem. 310, 315, Geiger

**123-124-125ex‡ Advanced Quantitative Analysis.** 5 credits first semester, \$17; 4 credits second semester, \$13.50.

Prerequisite: Analytic Chem. 1-2 or the equivalent.

**First Semester**

123-124 TTh 7:30 Campus Chem. 310,  
Geiger

**Second Semester**

124-125 TTh 7:30 Campus Chem. 310,  
Geiger

## CHILD WELFARE

**40 Child Training.** 3 credits. \$10.

The physical and mental development of the child; the training of young children; behavior problems and their various aspects; techniques of good and bad management. Prerequisite: Psy. 1-2.

**Second Semester**

M 8:05 St. P. Ext. Center 217, Cummings

**80 Child Psychology.** 3 credits. \$10.

A survey of the psychology of the young child from the standpoint of development and learning. Prerequisite: Psy. 1-2.

**First Semester**

T 8:05 Campus Folwell 110, Maurer

‡ Classes marked with a double dagger (‡) require a deposit of \$5, payable at Chemistry Department, of which \$2 is laboratory fee and the remainder for breakage. The unused portion is to be returned.

**82 Later Childhood and Adolescence. 3 credits. \$10.**

The meaning of adolescence; growth and personality development; vocational guidance; sex education, social adjustment, and emancipation from the family. Repeated second semester. Prerequisite: Psy. 1-2.

**First Semester**

M 8:05 St. P. Ext. Center 217, Cummings

**Second Semester**

T 4:40 Mpls. N. W. Bank Bldg. 690, Faegre

**90 Home, School, and Family Relations. 3 credits. \$10.**

Adjustment within and outside the family circle; relation of adults and children within the family; the establishment of the home; discussion of family problems such as finance, discipline, recreation, etc. Repeated second semester. Prerequisite: Psy. 1-2.

**First Semester**

T 4:40 Mpls. N. W. Bank Bldg. 664, Faegre

**Second Semester**

M 4:40 Mpls. N. W. Bank Bldg. 690, Faegre

**140 Behavior Problems. 3 credits. \$10.**

Nature and origin of behavior difficulties. Emphasis of the relation between early behavior trends and later maladjustments. Prerequisite: 12 credits in psy., ed. psy., or soc.

**Second Semester**

T 8:05 Campus Folwell 110, Maurer

**ECONOMICS**

See pages 64-66.

**EDUCATION**

Classes offered under this head are primarily for teachers in service who are unable to attend regular day classes or late afternoon or Saturday morning classes on the University campus. Classes in Education, unless otherwise stated, carry credit only in the College of Education. They may, however, be acceptable toward General Extension Division certificates when properly approved.

Credit in the College of Education is dependent upon the qualifications of the student, who must have completed the two years' work required for admission to the College of Education. This work may be completed either by graduation from a teachers college or normal school, a two-year course in the Junior College of the University or any accredited college, or in extension classes.

Students expecting to qualify for a degree should secure a copy of the College of Education Bulletin, which contains a statement of general requirements for graduation, of required courses in majors and minors, and of the specialized curricula, and should consult a major adviser as early in their course as possible. Failure to do so often delays graduation and makes extra work necessary.

The Students' Work Committee of the General Extension Division will be glad to assist students by advising what credits may be secured through extension classes and by assisting in securing the necessary official advice from the proper persons in the College of Education.

**Ed.C.I. 65 The Teaching of Science in the Elementary School. 3 credits. \$10.**

The content of the work in science in the elementary school including physical science, animal and plant studies; methods of presenting science content and of testing the results of the teaching. Prerequisite: Ed. 61A-B-C or equivalent.

**First Semester**

T 6:20 Campus Folwell 109, Carlson

**Ed.C.I. 105 Visual Aids in Teaching. 3 credits. \$10.**

A study of the characteristics, advantages, limitations, and practical school-room use of visual aids of both nonprojection and projection types. Gives specific laboratory practice in operation of usual projection machines. Provides information on sources of materials available for all grade levels, and includes demonstrations of practical uses of visual aids in various school subjects. Is intended as a definite means of working out solutions to individual visual aid problems. Prerequisite: Ed. 51A-B-C or equivalent.

**Second Semester**

Th 6:20 Campus Wesbrook 101, Archer

**Ed.C.I. 169 Extracurricular Activities. 3 credits. \$10.**

Study of the orderly organization and redirection of those pupil activities characteristic of adolescent youth; relation of extracurricular activities to the curriculum; classification and description of activities; control of activities; and the function of the sponsor. Prerequisite: 10 hours in education including Ed. 51A.

**Second Semester**

T 6:20 Campus Folwell 109, Bossing

**Ed.C.I. 181 Foundations of Elementary School Methods. 3 credits. \$10.**

A survey of the current philosophy and research which form the bases for improvement of elementary school instruction. Prerequisite: 10 quarter hours in education.

**First Semester**

Th 6:20 St. P. Ext. Center 212, Archer

**Ed.Psy. 60 Introduction to Statistical Methods. 3 credits. \$10.**

Statistical methods applied to educational investigation; measures of central tendency, variability and correlation; for classroom teachers and principals primarily. Higher mathematics not required although it will be of assistance. Prerequisite: 6 credits in psy.

**Second Semester**

M 6:20 Mpls. N. W. Bank Bldg. 690,  
Van Wagenen

**Ed.Psy. 120 Basic Principles of Measurement. 3 credits. \$10.**

Principles applied to the construction and use of tests and to the interpretation and evaluation of scores. Illustrations from mental and other aptitude tests, education, personality, and character tests. Repeated second semester. Prerequisite: Ed. 51A or equivalent.

**First Semester**

Th 6:20 Mpls. N. W. Bank Bldg. 690,  
Van Wagenen

**Second Semester**

Th 6:20 St. P. Ext. Center 216,  
Van Wagenen

**Ed.Psy. 140 Construction and Use of Educational Tests and Examinations. Not offered 1941-42.**

**Ed.Psy. 141 Construction and Use of Group Aptitude Tests. 3 credits. \$10.**

Replaces Ed. Psy. 134, Mental Tests. A study of group aptitude tests for all school levels with special emphasis on reliability and validity as instruments for educational and vocational guidance. Prerequisite: Ed. Psy. 120 or equivalent.

**First Semester**

M 6:20 St. P. Ext. Center 220,  
Van Wagenen

**Ed.Psy. 182 The Education of the Handicapped. 3 credits. \$10.**

A study of the characteristics, problems, and social adjustments of the handicapped, and the implications of the handicapped for educational practices. The groups discussed include the crippled, the hard of hearing, the poor visioned, the delinquent, and the mentally retarded. Prerequisite: Ed. 51A or 61A or equivalent.

**First Semester**

Th 6:20 Campus Burton 206, Bond

**H.Ed. 76 Conflicting Issues in Modern Education. 3 credits. \$10.**

An introduction to the basic controversies in current educational philosophy. The effects on educational practice of progressive, essentialist, and radical viewpoints. Not open to students who have taken Ed. 176. Prerequisite: 6 credits in psy.

**First Semester**

M 8:05 Campus Folwell 109, Brameld

**Art Education. See page 17.**

**Nursing Education. See page 39.**

**Physical Education (Recreation). See pages 46-48.**

**Preventive Medicine and Public Health. See pages 44-45.**

## ENGINEERING

See pages 71-79.

## ENGLISH

### Classes in Composition

**Preparatory Composition. No credit. \$7.50.**

Intensive drill on grammatical forms, structure, and theme writing. Repeated second semester. Note Composition 4-5-6 below.

**First Semester**

W 8:05 Campus Folwell 212, Conklin  
Th 6:20 St. P. Ext. Center 216, Lefevre

**Second Semester**

W 8:05 Campus Folwell 212, Lefevre

**4-5-6 Freshman Composition. 3 credits each semester. \$10.**

These classes satisfy the requirement in English for graduation and are prerequisite to other English classes. Must be taken in sequence. Admission based on satisfactory score in **English Placement Test**, or satisfactory completion of Preparatory Composition. The Placement Test is not a barrier to the student but is designed to determine as accurately as possible the student's probable success and thus prevent his attempting study for which he is inadequately prepared. As a result of the test, the student may be: (1) exempted from the requirement in English, (2) assigned to Composition 4, or (3) required to register for Preparatory Composition. Please note the following:

1. If you took the Placement Test in high school within the last four years, you must ask for assignment to the proper composition class a week before the first meeting of the class. (You need not take the test again.) Telephone, write, or call in person.

2. If you have not taken the test, report for it at the first date scheduled below:

**First Semester**

7:00	Thursday, September 25	Room 110, Folwell Hall, Campus
7:00	Thursday, October 2	Room 110, Folwell Hall, Campus
7:00	Thursday, September 25	St. Paul Extension Center 212

**Second Semester**

7:00	Thursday, February 5	Room 110, Folwell Hall, Campus
7:00	Thursday, February 12	Room 110, Folwell Hall, Campus
7:00	Thursday, February 5	St. Paul Extension Center 212

3. Tests will be given only as scheduled, and you cannot be admitted to a class for credit without taking the test.

4. Normally no student will be admitted to a class in Composition 4, 5, or 6 unless he has attended the first or second meeting.

5. If these regulations are not clear, or present seemingly insurmountable obstacles, apply for information at any office of the General Extension Division.

**First Semester**

4	T	6:20	Campus Folwell 102, Grandy
	W	8:05	Campus Folwell 302, Christie
	W	6:20	St. P. Ext. Center 217, Buckley
5	T	6:20	Campus Folwell 204, Scallan
6	W	6:20	Campus Folwell 226, McFadyen

**Second Semester**

4	T	6:20	Campus Folwell 204, Scallan
	W	8:05	Campus Folwell 204, Buckley
5	T	6:20	Campus Folwell 102, Grandy
	W	6:20	St. P. Ext. Center 217, Sanford
6	W	6:20	Campus Folwell 302, Christie

**4-5-6 Freshman Composition.** (Special one-year course) 4½ credits each semester. \$15.

For a limited number of students who wish to cover the entire sequence of Composition 4-5-6 in one year. Class meets for a period of 2½ hours each week. Prerequisite: Placement tests and permission of instructor.

**First Semester**

4-5 M 6:20 Campus Folwell 209, Dworsky

**Second Semester**

5-6 M 6:20 Campus Folwell 209, Dworsky

**English Review.** No credit. \$5.

A "refresher" course for those who need a quick and thorough review of grammar, mechanics, and usage. Will appeal to writers, executives, speakers, and professional people. More intensive than Preparatory Composition. Repeated second semester. Eight regular periods, beginning October 7 and February 10.

**First Semester**

T 8:05 Campus Folwell 212, Dworsky

**Second Semester**

T 8:05 Campus Folwell 212, Dworsky

**Classes in Writing**

**27-28† Advanced Writing I and II.** 3 credits each semester. \$10.

Offers training in the fundamentals of creative writing, through lectures and the criticism of manuscripts. Advanced Writing I deals with expository writing: articles, essays, criticisms, etc. Advanced Writing II deals with description and narration but is not offered 1941-42; see Advanced Writing III below. Students may begin with either I, II, or III. Prerequisite: Comp. 4-5-6, exemption, or consent of instructor.

**Second Semester**

27 T 6:20 Campus Folwell 203, Avery

*N.B.—Students may take either 27 and 28 or 27 and 29 for credit.*

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**29 Advanced Writing III. 3 credits. \$10.**

Lectures on the technique of writing, and criticism of student manuscripts. The work in this class is not specifically limited to a definite type of writing, as are Advanced Writing I and II. May be taken for credit with Advanced Writing I. Prerequisite: Advanced Writing I, or consent of instructor.

**First Semester**

T 6:20 Campus Folwell 203, Avery

**69-70† Short Story Writing I and II. 3 credits each semester. \$10.**

The technique of the short story with constructive work in story writing. Prerequisite: average of B in two semesters of 27-28, 29 or 65.

**First Semester**

69 M 6:20 Campus Folwell 205, Briggs

**Second Semester**

70 M 6:20 Campus Folwell 205, Briggs

**81-82-83 Essay Writing. Not offered 1941-42.****91-92 Seminar in Writing (Advanced Short Story). 3 credits each semester. \$10.**

For advanced students who write with facility and desire personal direction. Criticism of manuscripts submitted. Prerequisite: senior standing and 9 credits in Senior College English courses.

**First Semester**

91 M 8:05 Campus Folwell 304, Phelan

**Second Semester**

92 M 8:05 Campus Folwell 304, Phelan

**Theory and Practice. No credit. \$10.**

Reading and study in esthetic theories of creative writing. Personal criticism of manuscripts. The class is limited to twelve students, and admission is by consent of instructor only. Applications for admission must be made to the instructor at least one week before the first meeting of the class.

**First Semester**

M 7:00 Campus Folwell 203, Avery

**Second Semester**

M 7:00 Campus Folwell 203, Avery

**Manuscript Marketing. No credit. \$5.**

Analysis of markets for stories and articles. Methods of preparing and presenting manuscripts for sale; methods of studying editorial requirements and "slants." Eight regular periods, beginning October 28. No prerequisite.

**First Semester**

T 8:05 Campus Folwell 205, Loveridge

**Radio Script Writing I. No credit. \$10.**

The fundamentals of writing "for the ear," which requires a distinct technique: for advertisers, public service executives, educators, propagandists. Script of various types: educational, commercial, other, including entertainment. Special stress on announcements for varying time periods, 30-word, 50-word, and 1-minute. Longer script, using dialog; radio drama with music and sound effects, news and special programs. Repeated second semester. Prerequisite: a good command of English.

**First Semester**

F 6:20 Campus Folwell 308, Weaver

**Second Semester**

M 6:20 Campus Folwell 308, Weaver

**Radio Script Writing II. No credit. \$10.**

Basic plan: writing a series of 15-minute or longer programs for consecutive presentation. May be educational, commercial, for public service, or "sustaining," but must have radio showmanship and listener appeal built in. May be dramatic or other selected form. Students choose their own subjects. For those who have completed Radio Script Writing I.

**Second Semester**

F 6:20 Campus Folwell 308, Weaver

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**Radio Script Writing III.** Not offered 1941-42.

For journalism classes see pages 35-36.

**Classes in Literature****22-23† Introduction to Literature.** 5 credits each semester. \$17.

A study of English literature as to history and types of writing. 22, eighteenth century; 23, nineteenth century. Prerequisite to major in English and required for teacher's certificate. Prerequisite: Comp. 4-5-6 or exemption.

**First Semester**

22 M 6:20 Campus Folwell 204, Dunn  
W 6:20 St. P. Ext. Center 214, Hessler

**Second Semester**

23 M 6:20 Campus Folwell 204, Dunn  
W 6:20 St. P. Ext. Center 214, Hessler

**37-38 Contemporary Literature.** 3 credits each semester. \$10.

Readings, lectures, and discussions of contemporary British and American literature exclusive of the novel. Designed to help students appreciate and understand the literature of today and its relationship to modern life. Prerequisite: Comp. 4-5-6 or exemption.

**First Semester**

38 T 6:20 Campus Folwell 105, Sanford

**Second Semester**

37 T 6:20 Campus Folwell 105, Conklin

**55-56† Shakespeare.** 3 credits each semester. \$10.

Shakespeare's development as a dramatist; a careful study of a selected list of plays. Prerequisite: Comp. 4-5-6 or exemption; and 6 additional credits in English, or 10 credits in 21-22-23.

**First Semester**

55 T 6:20 Campus Folwell 101, Nichols

**Second Semester**

56 T 6:20 Campus Folwell 101, Nichols

**73-74† American Literature.** 3 credits each semester. \$10.

Lectures on American literature with extensive readings from the principal poets and prose writers of the United States; some attention to novelists. Prerequisite: consult instructor.

**First Semester**

73 W 6:20 Campus Folwell 105, McDowell

**Second Semester**

74 W 6:20 Campus Folwell 105, McDowell

**Greek Mythology.** 3 credits. \$10.

The origin and evolution of the myth, its relation to the literature, philosophy, religion, and art of ancient Greece, its influence on later literature. Illustrated lectures. No prerequisite.

**First Semester**

M 6:20 Campus Folwell 114, Heller

**The Great Books.** \$10 each semester.

This is a course for those who want the exciting experience of reading, informally with an instructor, the records left by the great minds of the past—the records which, as books, constitute the roots of modern literature and philosophy. The course is open to all who bring enthusiasm and the ability to read. It will appeal alike to intelligent persons with little formal education and to college graduates who have known the great books of the world only at second or third hand. The course is free of stereotyped procedure, formal prerequisites, and academic credit. There will be no examinations. This year the reading will include the following books: Mann, *The Magic Mountain*; Milton, *Areopagitica*; Hobbes, *Leviathan*; Montaigne, *Essays*; Lucretius, *On the Nature of Things*; Aristotle, *Ethics*. (Other reading may be added if time permits.)

**First Semester**

T 8:05 Campus Folwell 203, Avery  
W 6:20 St. P. Ext. Center 220, Avery

**Second Semester**

T 8:05 Campus Folwell 203, Avery  
W 6:20 St. P. Ext. Center 220, Avery

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.



**Book Reviews.** No credit. \$6.

A series of lectures on current books and authors. Books are chosen on the basis of their aliveness and interest for the present-day reader. This is a course for those interested in interpreting the world today, its scenes, personalities, and changing values as reported by the most able and significant of contemporary authors. It is not a recitation course, and there are no examinations or prerequisites. Second semester will include reviews of different books and of current New York plays. Ten regular periods, beginning Sept. 29 and 30, and Feb. 9 and 10.

**First Semester**

M 6:20 Campus Folwell 113, Acker  
T 6:20 St. P. Ext. Center 220, Acker

**Second Semester**

M 6:20 Campus Folwell 113, Acker  
T 6:20 St. P. Ext. Center 220, Acker

**How To Read Rapidly and Well.** See page 4.

**FISHING****Fish and Fishing in Minnesota.** No credit. \$6.

A short course for sportsmen and others who want accurate—but non-technical—knowledge of Minnesota fish: their habits and habitats, their feeding and propagation, their distribution and importance. Lectures, demonstrations, and discussion. Ten regular periods, beginning March 4. No prerequisite.

**Second Semester**

W 7:30 Campus Zoology 313, Eddy

**GARDENING****G.C. 56A Home Landscape Planning.** 3 credits in General College. \$10.

This class is intended to provide a background for the pursuit of gardening as a hobby. Principles of landscape design and their use in making the home grounds more useful, livable, and attractive; good and bad examples of home landscaping; plant materials—trees, shrubs, and garden plants—with special reference to their artistic use; independent student projects furnishing opportunity for application of principles to personal needs. No prerequisite.

**First Semester**

T 7:30 Campus Botany 4, Phillips

**G.C. 56B Home Landscape Planting and Materials.** 3 credits in General College. \$10.

An opportunity for the garden lover to learn more about plants—how, when, where to grow them; planting arrangement and composition; problem of planting a typical home garden. To be conducted from a cultural and appreciation viewpoint, appealing to those not particularly interested in the practical aspects of home landscaping. No prerequisite.

**Second Semester**

T 7:30 Campus Botany 4, Phillips

**G.C. 57A Home Gardening.** 3 credits in General College. \$10.

The very practical aspects of growing for the very practical gardener. Attention given to soils and their improvement; plants and their reproduction from seeds and slips; preparation of flower beds; planting and transplanting; pruning; fertilizing; cultivating; control of insects and diseases; watering; weeding, etc. No prerequisite.

**Second Semester**

W 7:30 Campus Botany 4, Phillips

**G.C. 57B Home Floriculture and Gardening.** 3 credits in General College. \$10.

Special autumn gardening activities; garden construction and maintenance; growing bulbs in the garden and in the house; plant propagation and culture; special attention to indoor gardening and house plant culture. Lectures, demonstrations, and student projects. No prerequisite.

**First Semester**

W 7:30 Campus Botany 4, Phillips

## GEOGRAPHY

**11 Human Geography.** 5 credits. \$17.

A study of the factors of the environment (space relationships, climate, soils, drainage, mineral wealth, contact with the sea, fauna, and flora) with particular reference to their limiting effect on human activities. Projects of current interest such as Soil Conservation, Flood Control, and River Improvement will be used as illustrative material. This class was formerly numbered 51; it is basic for all geography classes and counts toward either a major or minor in geography. No prerequisite.

**First Semester**

T 6:20 Campus Burton 103, Davis

**101 Geography of Europe.** 3 credits. \$10.

A study of the major geographic regions of Europe with particular emphasis on economic activities and urban development. Counts toward either a major or minor in geography. Prerequisite: 8 credits in geography.

**Second Semester**

T 6:20 Campus Burton 103, Dicken

**110 Geography of South America.** 3 credits. \$10.

A study of environmental conditions and their limiting effect on economic activities in the major geographic regions of South America. Counts toward either a major or minor in geography. Prerequisite: 8 credits in geography.

**Second Semester**

M 6:20 St. P. Ext. Center 212, Brown

**National Parks of the West.** See page 38.

## GEOLOGY

**1 General Geology (Dynamic).** 3 credits. \$10.

**A Dynamic Geology Laboratory.** 2 credits. \$7.

These classes, 1 and A combined, constitute Geology 1 of the College of Science, Literature, and the Arts. They consist of an introductory treatment of the materials of the earth, and the geologic processes; principles of earth sculpture, glaciation, volcanic activity, mountain building, etc.; geologic occurrence of gems, ores, oil, and other economic mineral resources. No prerequisite.

**First Semester**

1 T 6:20 Campus Pillsbury 210, Thiel  
A T 8:05 Campus Pillsbury 22, Gardiner

*N.B.—Registration may be made for the combined classes or for Geol. 1, but it is recommended that they be taken together. Students who have completed 3 credits in Geol. 1 or 8 may register for Geol. A.*

**2 General Geology (Historical).** Not offered 1941-42.

**B Historical Geology Laboratory.** Not offered 1941-42.

**3 General Geology (Economic).** Not offered 1941-42.

**4 Geology of Minnesota.** 3 credits. \$10.

The influences of geologic processes and their results as seen in the geology of the iron ranges, the granite districts, the areas of sedimentary rocks, the state parks, and the lake regions of Minnesota. Prerequisite: Geol. 1 or 8.

**Second Semester**

T 6:20 Campus Pillsbury 210, Thiel

**19 Physiography of the United States.** Not offered 1941-42.

**20 Glacial Geology.** Not offered 1941-42.

**27 Mineral Resources of North America.** 3 credits. \$10.

A study of the geology of the more important sources of vital and strategic minerals in North America. Recent developments in the iron, copper, lead, and zinc supply situation. Newly discovered and developed sources of antimony, manganese, chromite, tin, tungsten, and quicksilver. A nontechnical course for those interested in a better understanding of the role of mineral supplies in our present-day economy. Prerequisite: Geol. 1 or 8.

**First Semester**

Th 6:20 Campus Pillsbury 22, Anderson

**23 Mineralogy.** 3 credits. \$10.

A study of the physical and chemical characteristics of minerals; occurrence, genesis, and uses. Determinative work and identification of minerals by physical tests. No prerequisite.

**First Semester**

Th 6:20 Campus Pillsbury 110, Gruner

**24 Mineralogy.** 3 credits. \$10.

The crystal systems of the minerals. A continuation of the study of the minerals covering a larger variety of groups and species, and application of more advanced methods. Prerequisite: Geol. 23.

**Second Semester**

Th 6:20 Campus Pillsbury 110, Gruner

**25 Elements of Rock Study.** 3 credits. \$10.

A study of rock-forming minerals and of igneous, sedimentary, and metamorphic rocks, their occurrence and classification. Prerequisite: Geol. 23.

**Second Semester**

Th 6:20 Campus Pillsbury 110, Gruner

*N.B.—The second semester class will be either 24 or 25, depending on the wishes of the students.*

**45 Interpretation of Topographic Maps.** 3 credits. \$10.

This course is essentially a laboratory study of the application of the principles of physiography of the land and is based on the department's extensive sets of topographic maps. The discussion centers on land forms and the interpretation of the features delineated on contour maps. Practice is given in the recognition of the constructional or large-scale relief features as well as of those due to the destructional geologic agents such as wind, waves, streams, and glaciers. An elementary knowledge of physical geology is presupposed. Prerequisite: Geol. 1.

**First Semester**

T 6:20 Campus Pillsbury 220, Hanley

**61 Blowpipe Analysis.** Not offered 1941-42.

**National Parks of the West.** See page 38.

## GERMAN

**1-2 Beginning German.** 3 credits each semester. \$10.**First Semester**

1 M 6:20 Campus Folwell 207, Downs

**Second Semester**

2 M 6:20 Campus Folwell 207, Downs

**3 Beginning German.** 3 credits. \$10.

Prerequisite: German 1-2.

**First Semester**

M 6:20 Campus Folwell 206, Wangsness

**4 Intermediate German.** 3 credits. \$10.

Modern narrative prose. Prerequisite: German 3.

**Second Semester**

M 6:20 Campus Folwell 206, Wangsness

**17 German for Graduate Students.** No credit. \$10.

This course presupposes no knowledge of German. It is chiefly designed to help graduate students acquire a reading knowledge of German as required of candidates for higher degrees. Special sections will be maintained for beginners and for more advanced students when possible. The work of the course includes the rapid reading of simple, graded material based on a vocabulary frequency count; the intensive reading of approximately 100 pages of more difficult material pertinent to the student's field of specialization; a study of functional, elementary grammar with stress solely on the recognition of forms encountered in reading; and frequent progress tests. Students wanting to begin in second semester should get instructor's approval at first class

**First Semester**

M 6:20 Campus Folwell 212, Klitzke and Meessen

**Second Semester**

M 6:20 Campus Folwell 212, Klitzke and Meessen

**62 Nineteenth-Century Prose.** 3 credits. \$10.

Reading and discussion of stories by Keller, Meyer, Storm, Fontane, and others. Prerequisite: German 60 or consent of instructor.

**First Semester**

M 6:20 Campus Folwell 202, Wagman

**64 Nineteenth-Century Drama.** 3 credits. \$10.

Reading and discussion of plays by Kleist, Grillparzer, Hebbel, Anzengruber, and Hauptmann. Prerequisite: German 60 or consent of instructor.

**Second Semester**

M 6:20 Campus Folwell 202, Wagman

## HISTORY

**1-2† European Civilization.** 5 credits each semester. \$17.

Political, social, and economic factors. Course 1: 1500-1799; Course 2: 1799 to the present. No prerequisite.

**First Semester**1 M 6:20 Campus Folwell 104, Mudgett  
T 6:20 St. P. Ext. Center 219, Mudgett**Second Semester**2 M 6:20 Campus Folwell 104, Mudgett  
T 6:20 St. P. Ext. Center 219, Mudgett*N.B.—History 2 is an excellent preparation for Philosophy 70; see page 41.*

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**20-21† American History.** (Formerly Hist. 7-8) 3 credits each semester. \$10.

Course 20: 1763-1840; 21: 1840-1877. No prerequisite.

**First Semester**

20 M 6:20 St. P. Ext. Center 219, Kane  
T 6:20 Campus Folwell 104, Kane

**Second Semester**

21 M 6:20 St. P. Ext. Center 219, Kane  
T 6:20 Campus Folwell 104, Kane

**22 Recent American History (since 1877).** (Formerly Hist. 9) 3 credits. \$10.

Special emphasis on the social and economic factors. Prerequisite: 20-21.

**First Semester**

T 8:05 Campus Folwell 104, Kane

**56 Europe from 1648 to 1789.** 3 credits. \$10.

The building of the European absolute monarchies, the Intellectual Revolution and the "Enlightenment," the background of the American Revolution and of the French Revolution. No prerequisite but credit is dependent on taking the entire sequence, 56-57-58†.

**Second Semester**

W 6:20 Campus Folwell 102, Kane

**57 The French Revolution.** Not offered 1941-42.

**58 The Napoleonic Era.** 3 credits. \$10.

Nature and background of the Bonapartist dictatorship, growth by military conquest of the Napoleonic Empire, causes contributing to Napoleon's fall; striking parallels to present-day events and conflicts in Europe. No prerequisite but credit is dependent on taking the entire sequence, 56-57-58†.

**First Semester**

W 6:20 Campus Folwell 102, Kane

**61 Later Modern European History.** 3 credits. \$10.

Europe in the nineteenth century after Waterloo. Special attention is paid to the growth of nationalism and the unification of Germany and of Italy, the effects of modern industrialism and the rise of Marxian socialism. Concludes the sequence, 59-60-61†. No prerequisite.

**First Semester**

Th 6:20 Campus Folwell 104, Kane

**65-66† Europe in the Twentieth Century.** 3 credits each semester. \$10.

Course 65: 1900-1918; 66: 1918 to present. Europe in the early twentieth century, the background and causes of the first World War, the history of Europe during four years of war, the Paris Conference and peace treaties, the new political and social order in central and eastern Europe, the problems of the western democracies, the attempt at a new world order and its collapse, the background and outbreak of the second World War. No prerequisite.

**First Semester**

65 M 8:05 St. P. Ext. Center 219, Kane  
W 6:20 Campus Folwell 109, Deutsch

**Second Semester**

66 M 8:05 St. P. Ext. Center 219, Kane  
W 6:20 Campus Folwell 109, Deutsch

*N.B.—Credit will be given for Hist. 65 or 66 individually when the other is not offered in any subsequent semester during which the student is enrolled in extension classes.*

**83-84-85† American Economic History.** 4½ credits each semester. \$15.

American economic life in the colonial, early, and later national periods. No prerequisite.

**First Semester**

83-84 W 6:20 Campus Folwell 104,  
Mudgett

**Second Semester**

84-85 W 6:20 Campus Folwell 104,  
Mudgett

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**83a American Agricultural History. 3 credits. \$10.**

This course is planned to aid those who may be professionally interested in agricultural pursuits, but it is not too technical for the general public. The central theme of the course is the combination of European and Indian agriculture, plus American developments, into modern American agriculture. The course considers the following topics: European backgrounds; Indian agriculture; colonial agriculture; the plantation system and slavery; the decline of agriculture in New England; the opening up of the West and the wheat frontier; Great Plains agriculture; the cattleman's frontier; the development of cities and markets; improvements in transportation and communication; agricultural leaders, societies, and fairs; improvements in implements, animals, seeds, and methods; land policy; the government and agriculture; agrarian politics; inflations and depressions; wars and agriculture; agriculture since the World War. No prerequisite.

**Second Semester**

T 8:05 St. P. Ext. Center 216, Loehr

**95a Latin America in the Twentieth Century. 3 credits. \$10.**

A survey of the recent history of the Latin-American countries with special attention to their internal problems and policies; their relations with Europe and the United States; their economic, social, and cultural development, especially as related to Pan-Americanism. Lectures, discussions, and assigned readings. Repeated second semester. No prerequisite.

**First Semester**

T 8:05 St. P. Ext. Center 216, Jones

**Second Semester**

M 8:05 Campus Burton 221, Jones

**G.C. 6A-6B Current History—A Background of Current Affairs. 2 credits each semester in General College. \$7.**

Newspaper headlines and radio broadcasts reporting the current scene often seem confusing and contradictory. They provoke such questions as the following: What is the difference between totalitarianism and democracy—between fascism and communism? What are the causes for World War II? What are the interests of the United States in the present conflict? Why was France defeated, and what bearing does her defeat have on our own problems? The answers to these and similar questions, so necessary for an understanding of the present, require knowledge and understanding of their background. The purpose of this course is to draw upon the past in order to interpret the present. Current periodical and newspaper material from *Time*, *Newsweek*, and the *New York Times* will be used, and reference will be made to books by such authors as Gunther, William Shirer, Van Paassen, Louis Fischer, Vincent Sheean. Pertinent moving pictures will be used. Eleven meetings, beginning October 4 and February 11. No prerequisite.

**First Semester**

6A M 6:20 Campus Westbrook 201,  
Ylvisaker  
Th 6:20 St. P. Ext. Center 217,  
Ylvisaker

**Second Semester**

6B M 6:20 Campus Westbrook 201,  
Ylvisaker  
Th 6:20 St. P. Ext. Center 217,  
Ylvisaker

**The Making of Minnesota. No credit. \$6.**

The history of Minnesota from the first explorations to the present. The story of the native Indians, the coming of explorers, fur traders, and missionaries, the settlement of the state and the foundation of the commonwealth, the passing of the frontier, the rise of agrarian third parties, modern industry, agriculture, transportation, and social attitudes. Emphasis will be placed on the social, cultural, economic, and political factors. Ten regular periods beginning Oct. 1. No prerequisite.

**First Semester**

Th 8:05 Campus Folwell 105, Beeson

**Labor Movements. See page 67.****Recent Social Trends. See page 51.**

## HOME INTERESTS

**G.C. 14A Food Selection and Purchase.** 3 credits in General College. \$10.

There is a difference between random and intelligent food selection. This class will discuss these differences. What is the real relation between food and health? If you diet, do you diet wisely? When you dine out, what principles ought to govern your choice of menus? What factors determine whether home meal planning is drudgery or applied science? Do you recognize food fads and misleading advertising when you see them? The aim of this class is to help you get the most in health, economy, and satisfaction out of your food dollar; it is especially timely in view of present trends toward higher prices and government emphasis on national health as a part of the defense program.

**First Semester**

T 6:20 Campus Wesbrook 206, Fritzell

**G.C. 15A Selecting and Maintaining a Home.** 2 credits in General College. \$7.

The basis of this class will be the selection and care of a living place and its furnishings. House plans and design will be discussed from the standpoint of suggesting standards for living arrangements and standards of artistic judgment. The study of furnishing the home will include such questions as utilitarian needs to be met, securing attractiveness, purchase of furniture and furnishings, selection and hanging of pictures, and various cost problems. Eleven regular periods, beginning Sept. 29. No prerequisite.

**First Semester**

M 6:20 Campus Wesbrook 206, Jacobson

**G.C. 16A Clothing Selection, Purchase, and Care.** Not offered 1941-42.

**Child Welfare.** See pages 21-22.

**Home, School, and Family Relations.** See page 22.

**Housing.** See below.

**Interior Decorating.** See page 35.

**Textiles.** See pages 54-55.

## HOUSING

**Housing Minneapolis.** No credit. \$6.

A study of the individual and his home. Consideration of the natural process of deterioration which leads first to blighted areas and finally to slums. The effect of this deterioration on the individual, on his home as an investment and as a place to live, and on the neighborhood. Discussion of the remedies by which deterioration may be controlled and old areas replaced, involving city planning, zoning, public housing, and neighborhood associations. Ten regular periods, beginning Sept. 29. No prerequisite.

**First Semester**

M 8:05 Campus Folwell 113, Cerny

## HOW TO READ RAPIDLY AND WELL

See page 4.

## HOW TO STUDY

See page 3.

**INTERIOR DECORATING**

**ArtEd. 15 Interior Decorating.** 3 credits. \$10 plus 50 cents laboratory fee.

This class will give special attention to the identification of period and modern styles of furniture and to the problem of successfully combining several styles in one room. Additional subjects included are: wall treatment, floor coverings, color schemes, window treatment, lighting. Interesting optional field trips are planned. Drawing is not emphasized. Repeated second semester. No prerequisite.

**First Semester**

M 6:20 Campus Jones 2, Lewis  
 T 8:05 Campus Jones 203, Lewis  
 W 6:20 St. P. Ext. Center 212, Lewis

**Second Semester**

M 6:20 Campus Jones 2, Lewis

**ArtEd. 22 Advanced Interior Decorating.** 3 credits. \$10.

A continuation of Art Ed. 15. Color, history, and identification of decorative fabrics; study of china, glassware, and accessories. Discussion of materials used in building and styles of architecture. Students are required to do some elevation drawings in color. Auditing not advised. Juniors and seniors with skills or maturity in applying principles sufficient to carry this course at Senior College level may register for it as Art Ed. 72; consult instructor. Prerequisite: Art Ed. 15.

**Second Semester**

T 8:05 Campus Jones 203, Lewis  
 W 6:20 St. P. Ext. Center 212, Lewis

For other art classes see pages 16-18.

**JOURNALISM**

**13 Introduction to Reporting.** 3 credits. \$10.

A study of news, its sources, methods of finding and gathering; correct style of written presentation; brief survey of the place and purpose of the newspaper and the processes of newspaper production. Prerequisite: Eng. Comp. 4-5-6 or exemption.

**First Semester**

W 8:05 Campus Murphy 311, Steward

**69 Newspaper and Magazine Articles.** 3 credits. \$10.

The special feature article; typical subjects and their preparation for magazines, trade papers, Sunday newspapers, syndicates, house organs, etc.; the qualities that make stories salable, use of pictures, and the market. Prerequisite: Jour. 13.

**Second Semester**

W 8:05 Campus Murphy 311, Steward

**76 Judging Modern Books and Plays.** 3 credits. \$10.

A class for the reader who wishes to approach modern works with a better discrimination; not a technical journalism class. Standards of judgment and the need for them; application to fiction, poetry, essays, biography, criticism; humorous, scientific, and philosophical writings; the modern theater and its development; the work of the dramatic critic; the motion picture and its present stage of development; responsibility of reviewers. Prerequisite: consult instructor.

**Second Semester**

Th 8:05 Campus Murphy 311, Ford

**78 Publicity and Public Relations.** 3 credits. \$10.

A survey of the practices of workers in the fields of publicity. A study of the material for publicity campaigns, and practice in writing and production. Relation of publicity workers to the press. Public relations techniques



and publicity for institutions, clubs, schools, libraries, churches, business organizations, for movements and campaigns. Members of the class taking the course for credit will be encouraged to undertake projects related to organizations or activities with which they are associated. Prerequisite: Jour. 13.

**First Semester**

Th 8:05 Campus Murphy 311, Ford

**133ex Propaganda Analysis and Public Opinion.** 3 credits. \$10.

Today as never before the individual as consumer and citizen is battered from pillar to post by an army of professional propagandists who seek to channelize his opinions, attitudes, and buying habits. This class analyzes the social forces making propaganda inevitable in today's complicated social order; examines the objectives, often hidden or camouflaged, of various groups making use of techniques and devices to mold opinion; includes a study of the propaganda activities of governments, political parties, and other pressure groups; and attempts to measure the results of propaganda. A class for the layman, and for teachers in elementary and high schools and in junior colleges, who desire to study public opinion phenomena and to set up defenses against propaganda. Prerequisite: consult instructor.

**First Semester**

T 6:20 Campus Murphy 311, Wilson

For other writing classes see pages 25-26.

## MATHEMATICS

See pages 76-77.

## MEDICINE

See pages 44-46.

## MUSIC

Individual instruction in music, as well as study in the regular classes offered by the Department of Music, is open to registration through the General Extension Division by students who are not able to attend day classes full time. This includes instruction in piano, organ, voice, violin, cello, and all orchestral instruments, as well as classes in history and theory of music. Students will register as for extension classes but attend the regular day sessions. The courses offered, the time and place of meeting, and the fees for individual instruction will be found in the program of classes for the College of Science, Literature, and the Arts, in the Combined Class Schedule. For further information consult any office of the General Extension Division.

**1-2-3 Ear Training and Sight Singing.** 2 credits each semester. \$10.

Basic for all courses in music. Leads to the aural appreciation of tonal relationships through the study of scales, intervals, chords, melodic and harmonic dictation, and sight singing. No prerequisite.

**First Semester**

1 M 6:20 Campus Music 4, Kendall

**Second Semester**

2-3 M 6:20 Campus Music 4, Kendall

**4-5-6 Harmony.** Not offered 1941-42.

**34-35-36† History of Music.** 3 credits each semester. \$10.

A course in historical appreciation, designed to give an understanding of music as literature; a nontechnical account of the principal music forms, the historic origins and associations; the nature and scope of musical expression.

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

The class covers the history of music from Ancient Greece to the present day; it begins with Bach, continues to the twentieth century, and then reverts to the earliest period. Extensive musical illustrations. No prerequisite.

**First Semester**  
35-36 Th 6:20 Campus Music 103,  
Ferguson

**Second Semester**  
36-34 Th 6:20 Campus Music 103,  
Ferguson

**40-41-42 University Symphony Orchestra.** 3 credits for the year, \$5 per semester; or 3 credits each semester, \$10 per semester.

The University Symphony Orchestra is made available to extension students through the General Extension Division. Section 1 consists of the Symphony Orchestra, open to those qualified, both day and extension students; Section 2 will furnish opportunity for acquiring the skill and orchestral routine necessary for membership in the Symphony Orchestra. Tryouts to determine section membership, for both day and extension students. Open to players of orchestral instruments.

**First Semester**  
Sec. 1 W 7:30 Campus Northrop Aud.,  
Pepinsky  
Sec. 2 T 7:30 Campus Music Aud.,  
Pepinsky

**Second Semester**  
Sec. 1 W 7:30 Campus Northrop Aud.,  
Pepinsky  
Sec. 2 T 7:30 Campus Music Aud.,  
Pepinsky

*N.B.—Students may enter either semester, and may elect one or two meetings per week, with corresponding credit and fee.*

**43-44-45 University Chorus.** 3 credits for the year. \$5 per semester.

The University Chorus is available to extension students through the General Extension Division. Students may enter either semester upon consent of director.

**First Semester**  
T 7:00 Campus Burton Aud., Killeen

**Second Semester**  
T 7:00 Campus Burton Aud., Killeen

**56-57-58† Bach, Beethoven, Wagner, and Brahms.** 3 credits each semester. \$10.

Critical study of selections from the master works of the four greatest composers; biographical readings, topics and analyses, giving historical and literary background to culminative periods in composition. Open to those who have been in extension classes in music appreciation. 58 not offered 1941-42. Prerequisite: 34-35-36.

**First Semester**  
56 W 6:20 Campus Music 104, Ferguson

**Second Semester**  
57 W 6:20 Campus Music 104, Ferguson

**58Aex Wagner's Ring of the Nibelungen.** Not offered 1941-42.

**G.C. 24A-24B Music Today.** 3 credits each semester in General College. \$10.

Music appreciation is a study entirely different from the study of music history, of musical theory, or of musical performance. It is an activity open to all who have an interest in music, whether or not they have had previous training in voice or instruments. Thus no prerequisites are necessary. Music Today is a class for those who wish to develop or increase their enjoyment and understanding of music as a means toward life enrichment.

The material is presented by the lecture-laboratory method; that is, the lecture is carefully and completely illustrated with recordings. Students may enter either semester but the sequence of 24A and 24B is recommended in order to obtain a balanced and rounded appreciation.

**First Semester**  
24A W 7:00 Campus Westbrook 202,  
Hill and assistants

**Second Semester**  
24B W 7:00 Campus Westbrook 202,  
Hill and assistants

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**Minneapolis Symphony Orchestra, Season of 1941-42: Pre-Concert Talks. \$5.**

This series of talks will be given on Thursday nights preceding the weekly Friday concerts of the Minneapolis Symphony Orchestra. The talks will consist of illustrated, interpretive comments on the programmed works—the aim being to help concert-goers listen more discriminatingly and more enjoyably. The series will begin October 23 and terminate April 9; there will be approximately 17 one-hour sessions, certain Thursdays being omitted because of conflicts with the orchestra's concerts and winter tour. No prerequisite.

**First Semester**

Th 8:05 Campus Wesbrook 202,  
Ferguson, Pepinsky, Hill

**Second Semester**

Th 8:05 Campus Wesbrook 202,  
Ferguson, Pepinsky, Hill

**Piano Playing for Pleasure. No credit. \$10 plus \$1 laboratory fee.**

It is easy to play the piano. Within a semester's time enough of the art may be acquired to enable one to enjoy playing for one's own pleasure. The fundamentals (phrasing, rhythm, form) will be taught to individuals in small groups. The class is open to all, without previous musical training. Students may either begin or continue in the second semester.

**First Semester**

F 6:20 Campus Music 104, Twichell

**Second Semester**

F 6:20 Campus Music 104, Twichell

## NATIONAL PARKS OF THE WEST

**National Parks of the West. No credit. \$4.**

This series of six related lectures is planned for persons who want to know more about some of the national parks of the West, whether because of general interest or because of specific interest in connection with a future or past trip to the parks. Among the parks which will be discussed are Yellowstone and Glacier in the north, and Rocky Mountain, Grand Canyon, and other parks in the west and southwest. The talks will be illustrated, and will have to do with the natural features of these regions, their discovery and exploration, and the story of their early inhabitants. Six regular periods, beginning April 1. No prerequisite.

**Second Semester**

W 8:05 Campus Murphy Auditorium,  
Dicken

## NATURAL HISTORY

These classes are given in the Minnesota Museum of Natural History on the campus, by members of the museum's staff.

**Birds of Minnesota. No credit. \$10.**

A laboratory and field class in identifying and enjoying the birds of this region. Early meetings will make use of collections of the Museum of Natural History, but as soon as weather permits the class will meet in field locations. Study will be based on the manual of Dr. T. S. Roberts, who will be responsible for the class. No prerequisite.

**Second Semester**

T 6:20 Campus Museum of Natl. Hist. 309,  
Roberts, Breckenridge, and  
Kilgore

**Preparation and Preservation of Natural History Materials. No credit. \$10.**

Deals with the preservation and preparation of biological specimens (exclusive of microscopic materials) such as the making of scientific bird and mammal skins, casting of models, etc., for permanent collections for study or

exhibition. Designed especially for those interested in building up collections and demonstration materials for teaching purposes. No prerequisite.

**Second Semester**

T 8:05 Campus Museum of Natl. Hist. 304,  
Breckenridge

**NURSING EDUCATION**

**60 Ward Administration.** 3 credits. \$10.

Principles of administration, their application to ward management; opportunities for clinical teaching through efficient ward administration. Open to graduate nurses.

**First Semester**

M 8:05 St. P. Ext. Center 214, Hodgkins  
W 7:30 St. Mary's Hospital, Harrington

*N.B.—The St. Mary's Hospital class is open to all graduate nurses.*

**61 Personnel Work in Schools of Nursing.** Not offered 1941-42.

**69 Survey of Conditions and Trends in Nursing.** Not offered 1941-42.

**70ex Principles of Teaching and Supervision in Schools of Nursing.**  
3 credits. \$10.

Conditions favoring best preparation of the student nurse; sources, selection, and organization of subject matter; evaluation of nursing; principles and practices, and teaching methods; content and methods of clinical teaching. Repeated second semester. Open to graduate nurses.

**First Semester**

T 8:05 St. P. Ext. Center 212, Petry

**Second Semester**

T 8:05 Campus Med. Sci. 113, Petry

**7lex Curriculum Making in Schools of Nursing.** Not offered 1941-42.

**Principles of Public Health Nursing.** See page 45.

**Principles of Public Health Nursing for Nursing School Personnel.**  
See page 45.

**PARLIAMENTARY LAW**

**Parliamentary Law and Procedure.** 3 credits each semester for certificate. \$10.

An examination of the principles governing procedure in American parliamentary assemblies, with application of them to procedural problems in legislative, business, labor, and club organizations generally. Lectures, followed by classroom practice sessions. Students may enter or continue in the second semester. No prerequisite.

**First Semester**

F 6:20 Campus Folwell 109, McLaughlin

**Second Semester**

F 6:20 Campus Folwell 109, McLaughlin

**PHILATELY**

**Stamp Collecting.** No credit. \$10.

A basic course for beginners including: the historical, social, and commercial aspects of the hobby; the language of philately; the manufacture of stamps; the scope of collecting stamps, how and what to collect. No prerequisite.

**Second Semester**

M 8:05 Campus Folwell 109, Arnal

## PHILOSOPHY

**1 Problems of Philosophy (Introduction). 3 credits. \$10.**

Introduction to the problems of philosophy; the main fields of investigation; permanent problems; principal methods and schools of philosophy; historical and contemporary views. No prerequisite.

**First Semester**

W 8:05 Campus Folwell 322, Conger

**2 Logic. 3 credits. \$10.**

There is a difference between "straight" and "crooked" thinking. Logic is the study of these differences. What is a fallacy? How many pitfalls beset the attempt to think straight? When is a term properly defined? Why are sound definitions important? What is meant by a "syllogism"? What by a "dilemma"? What do you understand by proof? When is proof of a statement called for? When is it complete? What is a hypothesis? How many of these do you use in an average conversation? What is meant by "scientific thinking"? Do you do any of it? Logic is the systematic analysis of these and other related questions. The study of logic will show you what is involved in straight thinking. No prerequisite.

**First Semester**

Th 6:20 St. P. Ext. Center 216, Everett

**3 Ethics. 3 credits. \$10.**

Problems of life in terms of (1) contemporary social, political, and economic forces, and (2) the character of the individual; the psychological and philosophical foundations of morality; the reconstruction of morality; the history of morals and ethical thought. No prerequisite.

**Second Semester**

W 6:20 Campus Folwell 322, Everett

**10 Science and Religion. 3 credits. \$10.**

An introductory survey of problems of the relations of religion and science, followed by an investigation of religious experience and scientific thinking. No prerequisite.

**First Semester**

T 8:05 Campus Folwell 303, Norborg

**50 History of Ancient Philosophy. 3 credits. \$10.**

A survey of Greek and Roman philosophy in its ancient cultural setting. Development and meaning of the classical tradition. Special attention to Plato, Aristotle, and Plotinus. No prerequisite.

**Second Semester**

T 8:05 Campus Folwell 322, Conger

**53 The Meaning of Modern Science. 3 credits. \$10.**

A discussion of the methods, implications, and value of modern science. The main topics are scientific explanation; nature of theories; measurement and experimentation; the world-picture of present-day natural and social science. No prerequisite.

**Second Semester**

Th 6:20 Campus Folwell 322, Feigl

**63 Principles of Mature Thinking. 3 credits. \$10.**

From infantile to adult intelligence. A study of language, meaning, understanding, reasoning, and the ways of knowing. The functions of logic and experience. Critique of infantilisms in thought and conduct. Applications to problems of philosophy and education. No prerequisite.

**First Semester**

Th 6:20 Campus Folwell 102, Feigl

**70 Modern Philosophies of Social Reform.** 3 credits. \$10.

A historical and critical survey of social reformers from Adam Smith to the New Deal, with special attention to the philosophical ideas underlying reform movements. Prerequisite: 6 credits in phil. or 10 credits in one social sci.

**Second Semester**

W 8:05 Campus Folwell 303, Norborg

**PHOTOGRAPHY****Cameracraft.** No credit. \$10 plus \$5 laboratory fee.

An informal class for beginning and advanced amateur photographers who want the stimulating experience of working out photographic problems and projects with other amateurs under the guidance of a competent instructor. The extensive photographic laboratory of the School of Journalism will be available to members of the class. There will also be discussion, criticism, and help on individual projects. Prerequisites: enthusiasm, and some familiarity with darkroom practice and the use of a camera. Students furnish most of their supplies. Offered both semesters. Students may enter either semester or profitably repeat the class.

**First Semester**

M 6:20 Campus Murphy 20, Heenan

**Second Semester**

M 6:20 Campus Murphy 20, Heenan

**PHYSICS****7-8-9 General Physics.** 5 credits each semester. \$17.

A general class for students majoring in physics, mathematics, chemistry, and in the Institute of Technology; includes mechanics, sound, heat, light, and electricity. Laboratory work an integral part of the class. Prerequisite: Registration in Differential Calculus. Phys. 7 (Mechanics and Heat) first semester; Phys. 9 (Acoustics and Optics) second semester; Phys. 8 (Electricity and Modern Physics) second semester of 1942-43.

**First Semester**

7 MW 6:20 Campus Physics 166, Buchta

**Second Semester**

9 MW 6:20 Campus Physics 166, Buchta

**G.C. 37A Physics in Modern Life.** 3 credits in General College. \$10.

Most of us have at some time or other been asked, or have ourselves wondered, about many of the scientific facts with which we are continually associated. Why the sky is blue and sunset red, how the household refrigerator works, why some of us wear glasses, what causes dew, fog, clouds, and rain, what is sound and what promotes good acoustics, how the thermostat controls room temperature, what are X rays, what does science know about atoms and molecules, and what is the relation between atoms and electrons, and our practical applications of science? The many practical applications of science which we now enjoy depend upon the natural laws of the physical world. This sequence of lectures and demonstrations aims to provide acquaintance with these laws and facts of nature together with a knowledge of scientific method and an appreciation of scientific philosophy. Lecture demonstrations will provide a large part of the instruction. No prerequisite.

**First Semester**

T 6:20 Campus Physics 133, Vaughan

**POLITICAL SCIENCE****1† American Government and Politics, Part I.** 3 credits. \$10.

Every system of government operates upon the basis of certain fundamental principles and practices. These determine the general contours of the system. The objective of this course, therefore, is to acquaint the citizen with the fundamental principles and practices of the American system. Among the

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

questions for consideration are: What is a constitution? How did the American Constitution come into being? How has it been adapted to changing economic and social conditions? What are the various units of government in the United States? What are their interrelationships? What rights do persons living in the United States possess? How are they protected? How can one play an effective role in government? What is public opinion? What is a political party? How are candidates for office nominated? Who controls elections? How is the electoral process regulated and administered? No prerequisite but both 1 and 2 are required for credit.

**First Semester**

M 6:20 Campus Burton 209, Christensen

**2† American Government and Politics, Part II. 3 credits. \$10.**

To comprehend government as a process, as something vital and alive, one needs to have an understanding of the nature of the governmental machine and of the various pressures—pushes and pulls—that are the “steam” which determines when, how, and for whom the machinery operates. This course, therefore, is designed to give the student a knowledge both of the formal legal structure and operation of the legislative, executive, and judicial departments of the government and of the informal and extralegal practices that determine its vital character. Among the problems considered are: What is the purpose of a legislature? Should we have unicameral or bicameral legislatures? Where and how does legislation originate? How is a bill passed? What is the effect of the lobby on American politics? How are presidents and governors chosen? Is the administrative branch of government properly organized? Do we need a further extension of the merit principle in the civil service? What is the role of the courts in the American system? What is the effect of judicial review? Do we need judicial reform? No prerequisite but both 1 and 2 are required for credit.

**Second Semester**

M 6:20 Campus Burton 209, Kirkpatrick

**3 American Government and Politics, Part III. 3 credits. \$10.**

The emphasis of this course is not upon the structure of American government but upon the functions and activities which it undertakes and upon those factors in our contemporary society which affect the range of these activities. The course is designed to aid the citizen who wishes to be informed on how we conduct our foreign relations; who is responsible for our national defense policies; what are the revenue sources which government may tap in order to finance its manifold activities. The currently discussed problems of the relationships of government to business, to agriculture, and to labor are stressed. Evaluations of social welfare programs, ranging from public educational services and housing programs to old age and unemployment insurance, are included within the subject matter. No prerequisite.

**Second Semester**

T 6:20 Campus Burton 209, Christensen

**25 World Politics. 3 credits. \$10.**

The aim of this course is to explain the significance of contemporary events in Europe and the Far East, and their effects upon American interests. It does this, for example, by studying the foreign policies of the Great Powers and how they have moulded world events since 1918. It also takes up the influence of such factors as geographic position, the distribution of raw materials, accessibility of foreign markets, and armaments. The course discusses the problems of the next peace conference and the last, such as Czechoslovakia, Poland, and disarmament. It examines why the League of Nations failed, and the plans proposed for reconstruction and permanent peace such as the United States of Europe and Anglo-American co-operation. The schedule of lectures will be altered in order to explain any outstanding current developments and to trace their causes. No prerequisite.

**First Semester**

W 6:20 Campus Burton 209, Mills

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**38 American Political Campaigns and Elections.** 3 credits. \$10.

The way political parties and candidates win elections; the interplay of personalities, issues, organizations, and campaign funds; typical American political campaigns reconsidered for the purpose of isolating the causes of success and failure. No prerequisite.

**First Semester**

Th 6:20 Campus Burton 209, Starr

**40 Contemporary Political Philosophies.** 3 credits. \$10.

With one country after another falling beneath the onrush of Fascism, with a distressing faith in salvation through brutality reigning from Moscow to the Mediterranean, with American democracy facing the greatest challenge of its history, it is more important than ever before to examine the political philosophies that are now in conflict. We are living on the thin edge of history and it is essential that we know something of the ideological background of the great political movements of the modern world—Democracy, Communism, Nazism, Socialism, Fascism. This class, therefore, has as its objective the examination, comparison, and evaluation of the main ideas behind these various movements in order that the student may have a greater appreciation of the values inherent in the democratic system. No prerequisite.

**First Semester**

T 6:20 Campus Burton 209, Kirkpatrick

**44 New Governments in Europe.** 3 credits. \$10.

Reporting and analysis of recent developments in the domestic politics of the principal European nations. Which countries have made the shift from democracy to dictatorship? Which have adopted new constitutions? Which have new political parties or social classes in power? Reading of some of the latest reports of newspaper correspondents and other competent observers. No prerequisite.

**Second Semester**

Th 6:20 Campus Burton 209, Starr

**85 Problems of World Politics.** 3 credits. \$10.

The causes of the conflict between Japan, the United States, and the other western powers in the Far East and the western Pacific from the Philippines to French Indo-China and the Dutch East Indies; the role of tin, rubber, and oil; the Singapore naval base; the strength and weakness of Japan's position; how Japan's ambitions are linked with Russia's policy and the war in Europe. The problems of the Mediterranean from Gibraltar and North Africa to the Balkans and the Dardanelles; the aims of Germany, Italy, and Russia; the policies of Great Britain, France, and Turkey; the significance of Palestine, Iraq, and the Suez Canal. The contest between sea power and air power. No prerequisite.

**Second Semester**

W 6:20 Campus Burton 209, Mills

**Current History.** See page 33.

**Parliamentary Law.** See page 39.

**Propaganda Analysis.** See page 36.

**Recent Social Trends.** See page 51.

**PSYCHOLOGY**

**1-2 General Psychology.** 3 credits each semester but see note below. \$10.

The first semester of this class will consist of psychology for the layman. There will be a brief presentation of the general principles of psychology, followed by extensive application of those principles to typical interests and



life problems of adults today. The second semester will consist entirely of technical groundwork for those who expect to do advanced work in psychology.

**First Semester**

1 M 6:20 Campus Folwell 301, White  
 T 6:20 St. P. Ext. Center 212, White  
 W 4:20 Campus Folwell 110, White  
 W 8:05 Campus Folwell 301, White  
 F 6:20 Campus Folwell 110, White

**Second Semester**

2 M 6:20 Campus Folwell 301, White  
 T 6:20 St. P. Ext. Center 212, White  
 Th 4:20 Campus Folwell 110, White

*Note.*—Students who satisfactorily complete Psy. 1 will receive 3 credits toward an extension certificate. Only those who pass a special examination in Psy. 1 will go on to Psy. 2, and will receive, upon satisfactory completion of Psy. 2, 6 credits toward a degree for Psy. 1-2 combined.

**56 Psychology of Advertising.** See page 62.

**119 Personality: Facts and Theories.** 3 credits. \$10.

A course designed to dissolve the halo of mystery surrounding the concept of personality, to the end that persons may better understand themselves and those they influence. Special study of the many conditions, cultural and biological, which produce the varied traits distinguishing one person from another. Contrasts between personality in our society and the societies of primitive peoples. Emphasis upon the importance of early experiences in forming character. Prerequisite: Psy. 1-2.

**First Semester**

W 8:05 Campus Psychology 115, Harris

**140-141 Social and Political Psychology.** 3 credits each semester. \$10.

A psychological approach to problems of predicting and controlling social behavior with special reference to the techniques of persuasion and leadership, the role of suggestion and propaganda, the formation and measurement of attitudes, and the social aspects of motivation in competition and co-operation. Designed for teachers, group leaders, journalists, and others interested in human behavior. Prerequisite: Psy. 1-2.

**First Semester**

140 T 8:05 Campus Psychology 115,  
 Carlson

**Second Semester**

141 T 8:05 Campus Psychology 115,  
 Carlson

**144-145† Abnormal Psychology.** 3 credits each semester. \$10.

Normal and abnormal behavior contrasted; varieties of maladjustment as illustrated in criminality, deficiency, fanaticism, and insanity; the inadequacies of personality as shown in everyday life. Prerequisite: consult instructor.

**First Semester**

144 M 8:05 Campus Psychology 115, Bird

**Second Semester**

145 M 8:05 Campus Psychology 115, Bird

## PUBLIC AND PERSONAL HEALTH

### Preventive Medicine and Public Health

**53 Elements of Preventive Medicine.** 5 credits. \$17.

Nutrition, diet, susceptibility, resistance, and immunity to disease; methods of spread and prevention of communicable and degenerative diseases; protection of food, water, and milk; school health work; vital statistics. Prerequisite: 12 credits in biol. sci. or consent of instructor.

**First Semester**

T 6:20 Campus Millard 129, Cowan

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**54 Principles of Public Health Nursing for Nursing School Personnel.**  
4 credits. \$13.50.

Health teaching in the various services of a public health program with particular emphasis on the public health nurse's part in each phase of the program. Brief consideration of the organization and administration of public health nursing programs. No prerequisite.

**Second Semester**

T 6:20 Campus Med. Sci. 111, Pangburn

**60 Tuberculosis and Its Control.** \$10.

A nontechnical class, particularly for nurses, social workers, teachers, and others interested. History of tuberculosis movement and campaign in the United States; early diagnosis and sanitary treatment; tuberculosis in children; psychology of tuberculosis; supervision of returned sanatoria patients; state program for the eradication of tuberculosis; legislation. For credit and prerequisites consult instructor.

**Second Semester**

Th 7:30 Campus Univ. of Minn. Hosps.  
Eustis Aud., Myers

**62-63† Principles of Public Health Nursing.** 3 credits each semester.  
\$10.

Development of principles of organization, administration of public health nursing; methods of co-operation of social agencies; health teaching in promotion of individual and community well-being. Primarily for public health nurses. Prerequisite: P.M.&P.H. 53.

**First Semester**

62 M 6:20 Campus Millard 201, Palmer

**Second Semester**

63 M 6:20 Campus Millard 214, Palmer

**102 Environmental Sanitation I.** 3 credits. \$10.

Methods for promoting man's health and comfort by controlling his environment. Water supply sanitation, food sanitation, pollution abatement, sewage, excreta and waste disposal, bathing place sanitation, air hygiene, illumination, housing, control of insect and animal vectors of disease, industrial hygiene and sanitation. Prerequisite: P.M.&P.H. 53 or consent of instructor.

**Second Semester**

W 6:20 Campus Millard 214, Pierce

**Nursing Education.** See page 39.

**Personal Health**

**G.C. 10B The Human Body in Operation.** 3 credits in General College. \$10.

Most of us would like to know more than we do about how the human body operates. How, for example, is the body constructed? What is the exact location and function of those mysterious organs about which we hear so much and know so little—the kidney, the gallbladder, the heart, the pancreas? What are the pituitary, thyroid, and other important glands and what do they do? How do we see and hear? What happens during digestion, during sleep? Through a discussion of normal physiology and of some common abnormalities, this class aims to bring the layman an understanding of the construction and operation of the human body. No prerequisite.

**First Semester**

Th 6:20 Campus Westbrook 206, Potthoff

**G.C. 10C The Human Body in Health and Disease.** 3 credits in General College. \$10.

Clinical experience suggests many pointers for the average person who seeks understanding and practical help in meeting personal and community health problems. What common mistakes are made pertaining to accident in-

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

urance? What protection do we really have in our food and drug laws? What are the laws and what are the punishments for their violation? What suggestions are commonly made by psychiatrists for diminishing maladjustment and preventing mental disease? Why has insulin been given in schizophrenia? Is there much syphilis in Minnesota and how long is it contagious? This course is intended for the person who desires understanding in matters of personal and family health on such topics as maternal welfare, hay fever and the other allergies, cancer, heart disease, tuberculosis, colds, immunizations, and selection of a family physician. It devotes attention also to community and national health problems, costs, and proposals for solution. No prerequisite but it will be of advantage to have had G.C. 10B.

**Second Semester**

Th 6:20 Campus Wesbrook 206, Potthoff

## RECREATION

Note that these recreational activities are offered in three groups: for women only, for both men and women, for men only. Unless otherwise designated, all classes meet one hour per week, carry no credit, and require no prerequisites.

### Classes for Women

At University Farm Campus (St. Paul)

#### Swimming—for Women. \$5.

Instruction for beginners, intermediates, and advanced swimmers; water emergency tests; strokes; diving; lifesaving. Department furnishes regulation suits. Health examination at first meeting.

**First Semester**

T 7:30 Univ. Farm Gym., Eibner  
Th 6:30 Univ. Farm Gym., Eibner

**Second Semester**

T 7:30 Univ. Farm Gym., Eibner  
Th 6:30 Univ. Farm Gym., Eibner

#### Recreational Gymnastics and Plunge—for Women. \$5.

Instruction and practice in body-building and posture exercises for 30 minutes, followed by 15-minute swim.

**First Semester**

T 6:30 Univ. Farm Gym., Eibner  
F 10:00 a.m. Univ. Farm Gym., Eibner

**Second Semester**

T 6:30 Univ. Farm Gym., Eibner  
F 10:00 a.m. Univ. Farm Gym., Eibner

### On Main Campus

#### Beginning Swimming—for Women. \$5.

Class and individual instruction. A health examination, for which a fee of 50 cents is charged, will be given at the first class meeting. University furnishes regulation suit and towel for a fee of 10 cents.

**First Semester**

M 7:30 Campus Women's Gym. 51, Starr

**Second Semester**

M 7:30 Campus Women's Gym. 51, Starr

#### Intermediate and Advanced Swimming—for Women. \$5.

This is a class for those who know something about swimming and wish to increase their skill in strokes and diving. Instruction is given in the crawl, back crawl, side and breast strokes; elementary and advanced diving. Class and individual instruction. A health examination will be given at the first class meeting. A fee of 50 cents is charged for this examination. University furnishes regulation suit and towel for a fee of 10 cents.

**First Semester**

M 6:30 Campus Women's Gym. 58, Starr

**Second Semester**

M 6:30 Campus Women's Gym. 58, Starr

**Beginning Golf—for Women. \$5.**

Class and individual instruction in the use of the brassie, midiron, mashie, and putter. Discussion of rules, golf etiquette, and terminology. Last few lessons at University Golf Course. Class limited to 25. Equipment (clubs and soft balls) furnished by students.

**Second Semester**

T 6:30 Campus Women's Gym. 60, Thomas

**Intermediate Golf—for Women. \$5.**

First ten weeks: class and individual instruction in the use of the brassie, midiron, mashie, and putter; next seven weeks: supervised play at the University Golf Course. Students furnish own clubs. Class limited to 25. Prerequisite: some knowledge of and experience in golf.

**Second Semester**

M 6:30 Campus Women's Gym. 60, Snell  
 M 7:30 Campus Women's Gym. 60, Snell  
 W 6:30 Campus Women's Gym. 60,  
 Christensen  
 W 7:30 Campus Women's Gym. 60,  
 Christensen

**Archery—for Women. \$5 plus \$1 laboratory fee.**

Group and individual instruction in the technique of shooting with the bow and arrow. Class limited to twenty-five. Equipment furnished by the University.

**First Semester**

W 6:30 Campus Women's Gym. 60, Snell

**Beginning Tennis—for Women. \$5 plus court fees (25 cents each time or \$1 for season) payable at courts.**

Group and individual instruction. Instruction in the forehand and backhand drive, the service, and the chop. First eleven weeks' instruction given indoors; last six weeks at the university tennis courts. Individual practice for the improvement of strokes working with the tennis robot. Students furnish own tennis rackets and balls.

**Second Semester**

M 6:00 Campus Women's Gym. 151,  
 Christensen

**Intermediate Tennis—for Women. \$5 plus court fees (25 cents each time or \$1 for season) payable at courts.**

Group and individual instruction for those who have played tennis; technique for the lob, smash, drop shot, and volley is taught. Review of forehand and backhand drive and service. First eleven weeks' instruction given indoors; last six weeks at the university tennis courts. Individual practice for the improvement of strokes working with the tennis robot. Students furnish own tennis rackets and balls.

**Second Semester**

M 7:00 Campus Women's Gym. 151,  
 Christensen

**Rhythmic Exercises for Body Building—for Women. \$5 plus \$1 laboratory fee.**

Rhythmic exercise, group and individual, for general body control with special emphasis on streamlining the figure, posture, carriage, and relaxation.

**First Semester**

M 6:30 Campus Women's Gym. 153, Mee

**Activities Open to Both Men and Women**

**American Country Dancing—for Men and Women.** \$5 plus \$1 laboratory fee.

A recreational course reviving old American quadrilles, contradances, the schottische, polka, mazurka, Viennese waltz, and the more popular European folk dances.

**First Semester**

W 7:00 Campus Women's Gym. 151, Kane

**Badminton Club—for Men and Women.** One period, 21 weeks, \$7.

Four periods per week, as scheduled below, will be devoted to playing; not designed for teaching or coaching the game. Registration will be by periods, with a maximum of 16 players accepted for each. Prospective students should register at the campus office of the General Extension Division to insure acceptance in any period. Registration may be for more than one period per week. Students furnish own rackets and shuttlecocks.

**Periods:** 6:00 to 7:30 p.m., and 7:30 to 9:00 p.m. University Armory, Monday and Wednesday, beginning September 29 and continuing 21 weeks until March 4 with a recess at Christmas. In addition to the regular class periods, those registered may use the Armory badminton courts when available for general intramural play. In charge: Smith, Bowman.

**Classes for Men**

**Golf—for Men.** \$5 plus \$1 laboratory fee.

The fundamentals of golf—the grip, the stance, the swing for wood clubs, long irons, short irons, explosion shots, and the putter. Motion pictures or stereopticon slides show proper form of stroke. Eight to ten meetings for pictures, lectures, etc., will be held on Monday nights beginning February 9. Six lessons or appointments with competent golf instructors in the golf gymnasium will be scheduled for Tuesday, Wednesday, Thursday, or Friday evenings between February 17 and April 10. The last five meetings will be held, weather permitting, at the University Golf Course, where various professionals will assist. The outdoor schedule is adjusted to light. Students will furnish their own clubs.

**Second Semester**

M 7:00 Campus Physics Auditorium, Smith

**Physical Development—for Men.** \$5.

Exercises based on individual needs. Includes calisthenics, weight lifting, apparatus work, dual sports, and recreational activities. Adaptable for handicapped individuals.

**First Semester**

T 7:00 Campus Stadium 264, Osell

**Swimming—for Men.** \$5.

Class and individual instruction for beginners in all swimming strokes, in diving, in senior lifesaving; preparation for Red Cross examinations. Woolen bathing suits not permitted. Health examination at first meeting. Other sections arranged on demand.

**First Semester**

T 8:05 Campus Cooke Hall, Thorpe

**Second Semester**

T 8:05 Campus Cooke Hall, Thorpe

**Water Safety Instructors' Course.** Not offered 1941-42.

## ROMANCE LANGUAGES

## French

**1-2 Beginning French.** 3 credits each semester. \$10.

Grammar, pronunciation, reading, and practice in speaking. No prerequisite.

**First Semester**

1 W 6:20 Campus Folwell 227, Wilson

**Second Semester**

2 W 6:20 Campus Folwell 227, Wilson

**3-4 Intermediate French.** 3 credits each semester. \$10.

Grammar review, composition, readings from modern authors. Prerequisite: French 1-2 or 2 years of preparatory French.

**First Semester**

3 M 6:20 Campus Folwell 213, Fermaud

**Second Semester**

4 M 6:20 Campus Folwell 213, Fermaud

**5 French for Graduate Students.** No credit. \$10.

Fundamentals of grammar; reading of appropriate prose. Prepares for examinations in French. Students may enter or continue in second semester. No prerequisite.

**First Semester**

W 6:20 Campus Folwell 201, Brackney

**Second Semester**

W 6:20 Campus Folwell 201, Brackney

**54-55 French Conversation.** 3 credits each semester. \$10.

Based on French civilization. Prerequisite: French 4.

**First Semester**

54 T 6:20 Campus Folwell 202, Fermaud

**Second Semester**

55 T 6:20 Campus Folwell 202, Fermaud

## Spanish

**1-2 Beginning Spanish.** 3 credits each semester. \$10.

Grammar, pronunciation, reading, and practice in speaking. No prerequisite.

**First Semester**1 M 6:20 Campus Folwell 102, Grismer  
T 6:20 St. P. Ext. Center 216, Le Fort**Second Semester**2 M 6:20 Campus Folwell 102, Grismer  
T 6:20 St. P. Ext. Center 216, Le Fort**3-4 Intermediate Spanish.** 3 credits each semester. \$10.

Review, composition, readings from modern authors. Attention to correspondence and commercial practice if desired. Prerequisite: Spanish 1-2 or 2 years of preparatory Spanish.

**First Semester**3 M 6:20 St. P. Ext. Center 217, Cuneo  
T 6:20 Campus Folwell 201, Spiegel**Second Semester**4 M 6:20 St. P. Ext. Center 217, Cuneo  
T 6:20 Campus Folwell 201, Spiegel**53-54 Spanish Composition and Conversation.** 3 credits each semester. \$10.

Practical composition, including correspondence and conversation. Prerequisite: Spanish 3-4.

**First Semester**

53 T 6:20 Campus Folwell 209, Cuneo

**Second Semester**

54 T 6:20 Campus Folwell 209, Cuneo

## RUSSIAN

**Scientific Russian.** No credit. \$10.

This course presupposes no knowledge of Russian. It is chiefly designed for graduate students who wish to read scientific articles not available in translation. No prerequisite.

**First Semester**

M 6:20 Campus Folwell 124, Thielman

**Second Semester**

M 6:20 Campus Folwell 124, Thielman

## SCANDINAVIAN

**1-2 Beginning Norwegian.** 3 credits each semester. \$10.

Elements of grammar; conversation; simple composition; selected readings of easy prose and poetry; a simple Björnson classic in second semester. No prerequisite.

**First Semester**

1 M 6:20 Mpls. Pub. Library, Farseth

**Second Semester**

2 M 6:20 Mpls. Pub. Library, Farseth

**4 Advanced Norwegian.** 3 credits. \$10.

Based on one or more representative short stories. Reading, conversation, simple composition. Prerequisite: Scandinavian 1-2 or equivalent.

**First Semester**

W 6:20 Mpls. Pub. Library, Farseth

**5 Introduction to Norwegian Literature.** 3 credits. \$10.

Brief view of the whole field of Norwegian-Danish literature. Reading of representative plays or stories; conversation. Prerequisite: Scandinavian 4 or equivalent.

**Second Semester**

W 6:20 Mpls. Pub. Library, Farseth

**7-8 Beginning Swedish.** 3 credits each semester. \$10.

Grammar, composition, conversation, reading of selected prose. No prerequisite.

**First Semester**

7 T 8:05 Campus Folwell 206, Gustafson

**Second Semester**

8 T 8:05 Campus Folwell 206, Gustafson

**11-12 Readings in Swedish Literature.** 3 credits each semester. \$10.

Readings in representative Swedish authors from the Nineteenth and Twentieth centuries, aimed to illustrate some of the more important developments in modern Swedish culture. Prerequisite: a reading knowledge of Swedish.

**First Semester**

11 T 6:20 Campus Folwell 206, Gustafson

**Second Semester**

12 T 6:20 Campus Folwell 206, Gustafson

**6lex The Great Scandinavian Novels.** 2 credits. \$7.

An informal consideration of the form and contents of a number of the greatest of modern Scandinavian novels, including Selma Lagerlöf's *Gösta Berling's Saga*, Sigrid Undset's *Kristin Lavransdatter*, Verner von Heidenstam's *The Tree of the Folkungs*, Jonas Lie's *The Family at Gilje*, and Knut Hamsun's *Growth of the Soil*. Attention will be given to biographical material in so far as it directly affects the novels in question, and emphasis will be placed upon the relation of these novels to literary and general cultural trends in the Scandinavian countries in the last fifty years. Required reading available in English translation. 11 regular meetings, beginning October 2. No prerequisite.

**First Semester**

Th 7:30 American Institute of Swedish  
Arts, Literature, and Science,  
Gustafson

## SOCIOLOGY AND SOCIAL WORK

## Classes in Sociology

(Prerequisite to technical social work classes)

**1 Introduction to Sociology.** 3 credits. \$10.

A study of the culture of human society and the effect upon it of such influences as location, sex, race, custom, invention; culture patterns, processes, and social interactions; social change and means of control. Repeated second semester. No prerequisite.

**First Semester**

T 6:20 Campus Jones 109, Monachesi  
T 6:20 St. P. Ext. Center 217, Schneider  
Th 6:20 Campus Jones 109, Schneider

**Second Semester**

T 6:20 Campus Jones 104, Monachesi

**6 Social Interaction. 3 credits. \$10.**

The influence of social interaction on the development of personality with special reference to the family and community. The role of attitude and prejudices with special reference to race problems, forms of social opposition including competition, class tension, and war. Social change with reference to co-operation, public opinion, leadership, and social institutions. Prerequisite: Soc. 1.

**Second Semester**

M 6:20 Campus Jones 109, Kirkpatrick

**14 Rural Sociology. 3 credits. \$10.**

A study of rural and urban relationships; the principles of sociology applied to the position of an agricultural class in an industrial society; the contributions and obligations of farmers to the larger society, and vice versa. Prerequisite: Soc. 1.

**First Semester**

M 6:20 Campus Folwell 110, Tannous

**49 Social Pathology. 3 credits. \$10.**

A survey course in contemporary social problems with especial emphasis on the conditions and processes in personal demoralization and social disorganization. The scientific approach to the study of poverty, physical diseases and defectiveness, feeble-mindedness, insanity, vagrancy, etc. Repeated second semester. Prerequisite: 10 credits in soc., or Soc. 1 and 10 credits in soc. sci. or psy.

**First Semester**

W 6:20 Campus Jones 109, Sletto

**Second Semester**

Th 6:20 St. P. Ext. Center 212, Sletto

**60 Social Protection of the Child. 3 credits. \$10.**

Social obligations to the child; development of the child-saving movement in the United States; infant and child mortality; recreation, education, courts, institutions, societies, and other public efforts for the child. Prerequisite: Soc. 1 and 49.

**Second Semester**

T 6:20 Campus Jones 1A, Quinlan

**64 Human Behavior Mechanisms. 3 credits. \$10.**

A discussion of normal and abnormal behavior emphasizing the latter, especially its relation to problems met by the social worker. Application of psychoanalysis in understanding abnormal behavior. Prerequisite: 6 credits in soc. and 6 credits in psy.

**First Semester**

M 6:20 St. P. Wilder Disp., Lippman

**96 Recent Social Trends. 3 credits. \$10.**

Social changes in the United States since 1890 with special emphasis upon their relationships to problems of human welfare, social control, and social reorganization. Prerequisite: Soc. 1 or 10 credits in soc. sci.

**Second Semester**

Th 6:20 Campus Jones 109, Schneider

**110 Rural Organization. 3 credits. \$10.**

Social organization as it affects living conditions in small towns and rural districts. Especially designed for rural as well as other social workers, teachers, and specialists in rural sociology or agricultural economics. Prerequisite: 4 courses in soc., or Soc. 1 and 15 credits in soc. sci., ed., phil., or psy.

**Second Semester**

M 6:20 Campus Folwell 110, Tannous

**119 The Family. Not offered 1941-42.**

**Home, School, and Family Relations. See page 22.**



120 Cultural Change. Not offered 1941-42.

### Classes in Social Work

These classes are open to persons employed in social work positions who are recommended by the executive of the agency in which they are employed and approved by an adviser in the Graduate Course in Social Work. In satisfaction of requirements for membership in professional social work organizations, the courses listed are accounted as "technical social work" courses.

65 Psychiatric Aspects of Social Case Work. 3 credits. \$10.

A detailed discussion of cases that have been under intensive treatment; analysis of methods and philosophy of treatment. Limited to twenty students. Prerequisite: Soc. 64.

#### Second Semester

M 6:20 St. P. Wilder Disp., Lippman

84-85† Principles of Case Work. 3 credits each semester. \$10.

Social case work practices as applied to selected problems. Prerequisite: Soc. 1 and 49.

#### First Semester

84 Th 6:20 Campus Jones 2, Hayden

#### Second Semester

85 Th 6:20 Campus Jones 2, Hayden

94 Supervision in Social Case Work. Not offered 1941-42.

95 Social Work Agencies. Not offered 1941-42.

125 Principles of Group Work. Not offered 1941-42.

126 Problems of Supervision in Group Work. Not offered 1941-42.

127 Legal Aspects of Social Work. Not offered 1941-42.

151-152† Public Welfare. 3 credits each semester. \$10.

First semester deals with the history and functions of public welfare administration, with special emphasis on public assistance; second semester, with special problems of state and county administration of public welfare activities. Prerequisite: Soc. 1 and 49.

#### First Semester

151 T 6:20 Campus Jones 2, Hayden

#### Second Semester

152 T 6:20 Campus Jones 2, Hayden

### SPEECH (PUBLIC SPEAKING)

1-2-3† Fundamentals of Speech. 3 credits each semester. \$10 plus \$1 laboratory fee.

Speech as a means of social adaptation and control; techniques of body and voice; organization of speech material and study of types of speeches; practice for correctness and effectiveness in presentation. Voice recordings will be made. Prerequisite: Eng. Comp. 4-5-6 or exemption.

#### First Semester

1 M 8:05 Campus Folwell 308, Fulton  
T 8:05 St. P. Ext. Center 214, Gilkinson  
W 6:20 Campus Folwell 305, Hurd  
2 W 8:05 Campus Folwell 308, Hurd  
3 W 8:05 Campus Folwell 308, Hurd

#### Second Semester

1 M 8:05 Campus Folwell 5, Fulton  
T 6:20 St. P. Ext. Center 214, Gilkinson  
2 M 8:05 Campus Folwell 308, Ziebarth  
T 8:05 St. P. Ext. Center 214, Gilkinson  
W 6:20 Campus Folwell 308, Hurd  
3 M 8:05 Campus Folwell 308, Ziebarth  
T 8:05 St. P. Ext. Center 214, Gilkinson  
W 6:20 Campus Folwell 308, Hurd

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**Beginning Practical Speech Making.** No credit. \$10 plus \$1 laboratory fee.

Designed as a beginning course for business and professional people who are desirous of learning to speak extemporaneously so that their ideas may be presented in an organized way and expressed with confidence and effectiveness; individual attention to cases of nervousness or embarrassment. Each student speaks before the class each meeting. Beginning classes each semester; students may continue in Advanced Practical Speech Making. Voice recordings will be made. No prerequisite.

**First Semester**

M 6:20 Campus Folwell 5, Fulton  
T 6:20 St. P. Ext. Center 214, Fulton  
W 6:20 Campus Folwell 5, Fulton

**Second Semester**

W 6:20 Campus Folwell 5, Fulton

**Advanced Practical Speech Making.** No credit. \$10 plus \$1 laboratory fee.

Designed as an advanced course for business and professional people who are desirous of developing specific skill in extemporaneous speaking dealing with life problems and public questions; individual attention to special problems. Each student speaks before the class each meeting. Beginning classes each semester. Voice recordings will be made. Open only to students who have completed Beginning Practical Speech Making, except by special permission of instructor.

**First Semester**

Th 6:20 Campus Folwell 5, Fulton

**Second Semester**

M 6:20 Campus Folwell 5, Fulton  
T 6:20 St. P. Ext. Center 217, Fulton

**The Speaking Voice.** No credit. \$10.

The study and practice of principles of voice production; breathing, voice placement, melody, voice quality, the sounds of English speech; practice in articulation, phrasing, and connected speech in public speaking and oral reading of poetry and prose. No prerequisite.

**First Semester**

Th 6:20 Campus Folwell 308, Rarig

**51-52 Advanced Public Speaking.** Not offered 1941-42.

**65 Radio Speech.** 3 credits. \$10 plus \$1 laboratory fee.

Speech art and psychology of the radio; announcing and broadcasting; radio speech; radio drama; interpretive reading, voice, diction, articulation, and pronunciation. Practice, exercises, projects, and reports on problems of appeal and audience response. Voice recordings will be made. Repeated second semester. Prerequisite: Speech 1-2-3.

**First Semester**

Th 6:20 Campus Murphy 302, Ziebarth

**Second Semester**

Th 6:20 Campus Murphy 302, Ziebarth

**"Town Meeting" Discussion Group.** No credit. \$10 plus \$1 laboratory fee.

This course, growing out of the increased public recognition of our democratic responsibilities as well as our democratic rights, is designed to aid the student to become a more effective discussion leader and participant. Discussions will be held on the subjects chosen for the well-known radio feature, "America's Town Meeting of the Air," and will be based on the material made available by the Town Hall advisory service. Radio as well as platform discussion techniques will be considered, and each student will be given ample opportunity for participation. Voice recordings will be made. No prerequisite.

**First Semester**

M 6:20 Campus Murphy 302, Ziebarth

**Vocabulary Building I. No credit. \$5 plus \$1 materials fee.**

A practical course designed to increase students' speaking and reading vocabularies; presentation and discussion of words; exercises; reading lists. Mimeographed matter, in lieu of text, issued each meeting. Home study suggested but not required. Not a recitation class. Meets weekly for one hour. No prerequisite.

**First Semester**

M 6:00 Campus Folwell 322, Thorvilson  
7:00 Campus Folwell 322, Thorvilson  
W 6:00 St. P. Ext. Center 219, Thorvilson  
7:00 St. P. Ext. Center 219, Thorvilson

**Second Semester**

M 6:00 Campus Folwell 322, Thorvilson  
W 7:00 St. P. Ext. Center 219, Thorvilson

**Vocabulary Building II. No credit. \$5 plus \$1 materials fee.**

A more advanced and detailed study of words. Includes written composition, exercises, reports, tests; not a recitation class; home study recommended. May be taken as a continuation of Course I, or together with it. Meets weekly for one hour. No prerequisite.

**Second Semester**

M 7:00 Campus Folwell 322, Thorvilson  
W 6:00 St. P. Ext. Center 219, Thorvilson

**Speech Hygiene I-II. No credit. \$10.**

A study of: behavior as indicated through speech; why and how a man talks; basic elements in the development of unsocial and inadequate emotional patterns; speech symptoms evaluated from cause and effect relations; psychologic and social factors in speech, analysis of individual problems of self-consciousness, stage fright, and general ineffective conversational speech; speech as a means of self and social control in daily living. I is prerequisite to II. Students completing Speech Hygiene II will be permitted credit for one semester's work in Fundamentals of Speech.

**First Semester**

I T 6:20 Campus Folwell 308, Bryngelson

**Second Semester**

II T 6:20 Campus Folwell 308, Bryngelson

**Speech Correction: Stuttering. No credit. \$10.**

Individual and group work on the correction of stuttering. Treatment of neurological, psychological, and emotional aspects of the difficulties of each class member. Enrolment limited to adults. Permission of instructor required.

**First Semester**

M 6:20 Campus Folwell 404, Brown

**Theater.** See page 55.

**SURVEY OF PHYSICAL AND SOCIAL SCIENCES****1-2 Man in Nature and Society. 3 credits each semester. \$10.**

A survey of certain aspects of contemporary thought concerning the specific physical and social sciences; nontechnical, designed for the layman. Class 1, physical sciences; Class 2, social sciences. No laboratory work and no knowledge of science required. No prerequisite.

**First Semester**

1 T 6:20 Campus Folwell 113, Shaw  
2 M 6:20 St. P. Ext. Center 216, Schmidt

**Second Semester**

2 T 6:20 Campus Folwell 113, Shaw  
1 M 6:20 St. P. Ext. Center 220, Carlson

**TEXTILES****Textiles. 3 credits. \$10 plus 50 cents materials fee.**

An introductory course concerning the manufacture, qualities, finishes, and testing of fabrics in the stores today—in ready-to-wear for men and women and in home furnishings. Planned for consumers, store people, and manu-

facturers. Includes new fibers and study of current advertising and comparative values. No prerequisite.

**First Semester**

M 6:20 Campus Chemistry 115, Caplin

**Interior Decorating.** See page 35.

**THEATER**

**G.C. 25A Film and Drama Today.** 3 credits in General College. \$10 plus \$2 laboratory fee.

The aim of this class is to increase the entertainment value of the film and the drama by developing a more aware, a more appreciative, and, consequently, a more demanding audience. To accomplish this there will be shown to the class preselected films of high entertainment value that exemplify superior film techniques. These will form the basis for the lecture-discussions. Film and Drama Today is not a course in film production nor is it one in stagecraft. It is designed for those who wish to increase their enjoyment of the theater as a member of the audience. Actual playgoing is also a part of the course. The laboratory fee covers admission to five movies of the University Film Society and to three plays of the University Theatre. No prerequisite.

**First Semester**

Th 8:05 Campus Museum of Natl. Hist.  
307, Hamilton

*N.B.—Numbers of the following classes are those of the Speech Department.*

**31 Introduction to the Theater.** Not offered 1941-42.

**32-33 Beginning Acting.** Not offered 1941-42.

**34 Stagecraft (Construction and Painting).** Not offered 1941-42.

**66 Radio Drama.** 3 credits. \$10.

Dramatic production and the radio—a study of the fundamental problems of directing and acting radio drama. Projects and reports on types and appeals of material and production methods; exercises in characterization, voice, and diction. Prerequisite: Speech 1-2-3; recommended, Speech 65.

**Second Semester**

T 8:05 Campus Murphy 302, Lees

**71 Fundamentals of Direction.** No credit. \$10.

A practical course for teachers or those engaged in producing plays. The processes of play production as controlled by the director are followed through their logical sequence from the selection of the play to its actual presentation. Demonstrations and projects in actual production procedures. Special attention to the problems of play selection, blocking, motivation, organization, and polishing. No prerequisite.

**First Semester**

T 8:05 Campus Music 19, Lees

**\*78-79 Advanced Acting (Characterization and make-up).** 3 credits each semester. \$10 plus \$1 laboratory fee.

The arts of pantomime, voice, and characterization, with exercises in one-act plays and projects of the University Theatre. Prerequisite: Speech 31-32-33.

**First Semester**

78 T 6:20 Campus Music 19, Lees

**Second Semester**

79 T 6:20 Campus Music 19, Lees

\* Students registered in starred classes are eligible for tryout in construction and acting phases of University Theatre activities.

## ZOOLOGY

**1-2ex† General Zoology.** 5 credits each semester. \$17.

Structure, physiology, embryology, classification, genetics, and evolution of animals. Equivalent to Zool. 1-2-3 in day class. No prerequisite.

**First Semester**

1 MW 6:20 Campus Zool. 211,  
Woodsdalek

**Second Semester**

2 MW 6:20 Campus Zool. 211,  
Woodsdalek

**21 Histology.** Not offered 1941-42.

**51 Parasitology.** 5 credits. \$17.

An elementary class dealing with parasitic protozoa, worms, and arthropods, in their relation to diseases of man and animals. Lectures and laboratory. Prerequisite: Zool. 1-2-3 or equivalent.

**First Semester**

TTh 6:20 Campus Zool. 211, Wallace

**Birds of Minnesota.** See page 38.

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

## BUSINESS

This department recognizes the professional status of the business executive. Scientific methods in analyzing business data, trained intelligence in handling the human relationships inherent in business, and a well-developed sense of moral responsibility will be the foundations of business effectiveness in the future. The training of prospective executives along these lines is more important than any detailed drill on special processes. At the same time there are those with definite interest in certain special fields who seek improvement and advancement, and to these the opportunity for scientific training and information is invaluable. The classes here offered aim to serve both kinds of students; and these students are able, because of their daily employment in work related to their studies, to make the most advantageous use of their opportunity.

### Certificates

The General Extension Division certificate in business is awarded to students who have met the requirements listed below, as a recognition of their completion of a well-planned program of study. This program contains a basic core requirement which is a broad and general preparation for business life. In addition, it offers a number of specialized lines in which the student may concentrate as specific preparation for or assistance in his immediate vocation.

1. Each candidate must have completed 90 credits, with an average grade of C, including the following basic requirements:

	Credits
Principles of Economics (Econ. 6-7).....	6
English* (Eng. 4-5-6, or 1ex-2ex).....	6 or 9
Business Law (B.A. 51, 52, and either 53 or 54).....	9
Principles of Accounting.....	8 or 9
Elements of Statistics (Econ. 5).....	3
Elements of Money and Banking (Econ. 3).....	3
Corporation Finance (B.A. 155).....	3
Business Cycles (Econ. 149).....	3
Investments (B.A. 146).....	3
Man in Nature and Society.....	6

Total ..... 50 or 54

2. Each candidate must also have completed 18 credits in one of the following groups, selecting the credits from the classes listed below:

- a. **Accounting:** Advanced General Accounting (B.A. 139); Practice and Procedure (B.A. 150-151); Auditing (B.A. 135-136); Cost Accounting (B.A. 152-153, 133, 181A); Income Tax Accounting (B.A. 134); Accounting Topics (B.A. 180A-181A-182A-183A); Intermediate Accounting (Econ. 26); Tabulating Equipment (B.A. 91).
- b. **Finance:** Advanced Money and Banking (B.A. 142); Labor Problems (Econ. 161); Securities Market (B.A. 148); Economics of Public Utilities (B.A. 165); Public Finance (B.A. 58); Advanced General Economics (Econ. 103-104 or B.A. 101-102); Cost Accounting (B.A. 152-153); Business Law (B.A. 54); Intermediate Accounting (Econ. 26); Investments (B.A. 146).

\* Students whose work in English is not entirely satisfactory may be required to take other English classes.

- c. **General Business:** Business Policy (B.A. 109); Business Cycles (B.A. 149); Mathematics of Investment (Math. 20); Advanced General Accounting (B.A. 139); Cost Accounting (B.A. 152-153, 133, 181A); Labor Problems (Econ. 161); Geography 41, 51; approved electives.
- d. **Insurance:** Psychology 6 or 9 credits; Life Insurance (B.A. 59); Fire and Marine Insurance (B.A. 60); Casualty Insurance (B.A. 61); Fidelity and Surety Bonding; Mathematics of Investment (Math. 20); Advanced General Accounting (B.A. 139); Unemployment Insurance Accounting; Suretyship; General Insurance.
- e. **Advertising:** Psychology 1, 2, 56; Journalism 13, 65, 69; Elementary Advertising (B.A. 88); Retail Advertising; Advanced Advertising and Typography (B.A. 194); Commercial Drawing; Graphic Arts 64.
- f. **Merchandising:** Retail Credits; Retail Store Management (B.A. 69); Survey in Marketing (B.A. 77); Psychology 1, 2, 56; Elementary Advertising (B.A. 88); Retail Advertising; Transportation (B.A. 71-72); Retail Credits and Collections I-II.
- g. **Transportation (Traffic):** Economics of Public Utilities (B.A. 165); Geography 41, 51, 102; Transportation (B.A. 71-72, 80-81); Advanced Traffic and Transportation I and II; Casualty Insurance (B.A. 61); Fire and Marine Insurance (B.A. 60); General Insurance.
- h. **Personnel Administration:** Personnel Administration (B.A. 167); Advanced Personnel Administration (B.A. 168); Psychology 1, 2, 130, 160; Labor Problems (Econ. 161); Labor Legislation and Social Insurance (Econ. 164); Labor Movements (Econ. 162ex); Casualty Insurance (B.A. 61); Unemployment Insurance Accounting; Sociology (various).

3. The remaining credits, to make a total of 90, may be chosen from any classes offered in this bulletin, except those marked "No credit."

4. Students who have completed 45 credits of the above certificate requirement and have had these credits approved by the Students' Work Committee will be granted a preliminary certificate, issued informally.

### Degrees

A degree in the School of Business Administration may be earned by satisfactory completion of the two-year prebusiness course of the College of Science, Literature, and the Arts, and of two more years of prescribed work of the School of Business Administration (see the Bulletin of the School of Business Administration). A candidate for a business degree must apply to the dean of the School of Business Administration at least one year before he expects to be eligible for a degree, must comply with the degree requirements of the school, and must complete at least 45 credit hours of the requirements for a degree under the supervision of the adviser appointed for him. The Students' Work Committee of the General Extension Division will be glad to assist the student in arranging for this advice.

### ACCOUNTING

Accounting classes are listed in two groups: Sequence Classes and Special Interest Classes. Students who are beginning the study of accounting should take the Introductory Sequence (consisting of the basic class, Econ. 20L-25L Principles of Accounting and Accounting Laboratory, and B.A. 150-151 Accounting Practice and Procedure) and then go on with the advanced sequences: Cost Accounting, Auditing, Advanced Accounting, Financial Interpretation. Students with special interests will want to take certain of the Special Interest Classes.

**Sequence Classes**

**Introductory Accounting Sequence**

**Econ. 20L-25L† Principles of Accounting and Accounting Laboratory.**  
4 credits each semester. \$13.50 plus \$1 materials fee.

Lectures and discussions with working out of selected cases; compilation of accounting data; balance sheets, operating statements, accounting records, adjustment of accounts, accounting work sheets; the principles underlying the computation of profit and loss and the statement thereof. No prerequisite.

First Semester				Second Semester			
20L	M	6:20	Campus Vincent 307, Smith	25L	M	6:20	Campus Vincent 307, Smith
	M	6:20	St. P. Ext. Center 218, Montgomery		M	6:20	St. P. Ext. Center 218, Montgomery
	M	6:20	St. P. 1st Natl. Bank 904 East, LeBoriosis (Organized for A.I.B. members but open to others also.)		T	6:20	Campus Vincent 307, Ostlund
	T	6:20	Campus Vincent 307, Ostlund		Th	6:20	Mpls. N. W. Bank Bldg. 664, Smith
	Th	6:20	Mpls. N. W. Bank Bldg. 664, Smith		F	6:20	St. P. Ext. Center 218, LeBoriosis
	F	6:20	St. P. Ext. Center 218, LeBoriosis				

*N.B.—The following combined course offers Accounting 20L-25L complete in one semester—20L the first eight weeks and 25L the second eight weeks. Fees: \$13.50 each course plus \$1 materials fee in St. Paul class. Registration and fees accepted for combined course or for one class at a time, either class.*

Second Semester			
TF	6:20	Campus Vincent 306	
TTh	6:20	St. P. Ext. Center 218, LeBoriosis and Montgomery	

**B.A. 150-151† Accounting Practice and Procedure.** 3 credits each semester. \$10 plus \$1 materials fee.

Practice in the peculiar accounting problems of business and the particular skills of the practicing accountant. Prerequisite: Econ. 20L-25L or equivalent.

First Semester				Second Semester			
150	T	6:20	Campus Vincent 113, Sevenich	151	T	8:05	Campus Vincent 113, Houston
	T	8:05	Campus Vincent 113, Houston		W	6:20	St. P. Ext. Center 218, Rotzel
	W	6:20	St. P. Ext. Center 218, Rotzel				
	W	8:05	St. P. Ext. Center 218, Sevenich				

**Cost Accounting Sequence**

**B.A. 152-153† Beginning Cost Accounting A and B.** 3 credits each semester. \$10.

Principles used to determine the profitableness of each branch of manufacturing, and basis for judging the relative efficiencies of operation; materials, labor, and burden; continuous process and production order costs; burden distribution methods, standard costs, etc. Prerequisite: Econ. 25L or equivalent.

First Semester				Second Semester			
A	T	6:20	Campus Vincent 115, Rotzel	B	T	6:20	Campus Vincent 115, Rotzel
	W	6:20	St. P. Ext. Center 216, Tuttle		W	6:20	St. P. Ext. Center 216, Tuttle

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.



**Advanced Cost Accounting C and D.** 3 credits each semester for certificate. \$10.

A detailed practical application to business situations of the principles of cost accounting, and the installation of cost systems; burdens and burden centers; *pro forma* journal entries; wage methods; change from job to process cost methods; by-product accounting; forms. Prerequisite: B.A. 152-153.

**First Semester**

C W 8:05 St. P. Ext. Center 216, Tuttle

**Second Semester**

D W 8:05 St. P. Ext. Center 216, Tuttle

**Auditing Sequence**

**B.A. 135 Auditing and Public Accounting.** 3 credits. \$10.

The application of principles and technical methods used in professional auditing practice. Typical frauds and errors in accounting records; auditors' working papers, financial exhibits, certificates, and reports are studied. Prerequisite: B.A. 139 or 150-151.

**First Semester**

M 6:20 Campus Vincent 113, Reighard  
W 8:05 St. P. Ext. Center 217, Rotzel

**B.A. 136 Internal Auditing and Accounting Control.** 3 credits. \$10.

Accounting systems and methods as related to internal check and audit control of routine transactions, and the establishment of administrative and budgetary control. Prerequisite: B.A. 139 or 150-151.

**Second Semester**

M 6:20 Campus Vincent 113, Reighard  
W 8:05 St. P. Ext. Center 217, Rotzel

**Advanced Accounting Sequence**

**B.A. 180A Accounting Topics—Budgetary Control.** 3 credits. \$10.

Budget systems in business—types and kinds; budgeting of every sort of item; budget administration, committees, etc.; budget reports and statements—form, content, and use; problem studies, solutions; recent developments in foundations for budgetary control. Prerequisite: consult instructor.

**First Semester**

T 8:05 Campus Vincent 115, Rotzel

**Advanced Accounting Problems.** 3 credits for certificate. \$10.

Designed to meet the needs of advanced accounting students, professional accountants, and comptrollers; concerned primarily with the analysis of accounting problems (approximately 30) and their solution; representative problems from various state C.P.A. examinations. Prerequisite: consult instructor.

**Second Semester**

T 8:05 Campus Vincent 115, Sevenich  
W 8:05 St. P. Ext. Center 219, Sevenich

**Constructive Accounting Accounting Systems** } Not offered in 1941-42.

**Financial Interpretation Sequence**

**Econ. 26 Intermediate Accounting.** 3 credits. \$10.

This course is a comparative study of various accounting procedures which result in different concepts of balance-sheet valuation and income determination. Econ. 26 and B.A. 139 together constitute a one-year course for students interested in financial and investment work where training in analysis and interpretation of accounting statements is necessary. Prerequisite: Econ. 20L-25L.

**First Semester**

W 6:20 Campus Vincent 307, Ostlund

**B.A. 139 Advanced General Accounting. 3 credits. \$10.**

Primarily for the general business student. Interpretation of balance sheets and statements, particularly as found in corporation and investment publications; preparation, analysis, and utilization of statements; holding company and consolidated statements. Prerequisite: Econ. 26.

**Second Semester**

W 6:20 Campus Vincent 205, Heilman

**Special Interest Classes****Elements and Principles of Accounting (A.I.B.) I and II. 3¼ credits. \$12.50.**

A special class, primarily for members of the American Institute of Banking, Minneapolis chapter, covering the essentials of Econ. 20L and 25L, which see above. Students completing receive 7½ credits and may continue with advanced classes in accounting. Begins September 19. No prerequisite.

**First Semester**

I TF 6:35 McKnight Bldg. 250, Lund

**Second Semester**

II TF 6:35 McKnight Bldg. 250, Lund

**B.A. 91 Tabulating Equipment Laboratory and Methods. Not offered 1941-42.****B.A. 133 Cost Methods. Not offered 1941-42.****B.A. 134 Income Tax Accounting. 3 credits. \$10.**

Application of income tax laws to various business conditions; possible errors in preparation of income tax reports; state as well as federal problems. Prerequisite: B.A. 151.

**First Semester**

M 8:05 St. P. Ext. Center 216, Connolly

T 8:05 Campus Vincent 105, Connolly

**B.A. 134ex Income Tax Accounting Survey. 2 credits. \$7.**

A brief survey of current regulations and principles governing the preparation of tax returns from accounting and other records. Eleven regular periods beginning January 8. No prerequisite.

**First Semester**

Th 6:20 Campus Vincent 113, Reighard

**B.A. 158 Governmental Accounting. 3 credits. \$10.**

Use of budgetary and financial accounts; fund accounting and statements; consolidated municipal statements; accounting for fixed properties, depreciation, improvements, special assessments, and revolving funds; debt service and sinking fund. Prerequisite: B.A. 139 or 151.

**First Semester**

W 6:20 Campus Vincent 205, Heilman

**ADVERTISING**

Students without previous training in this field should begin with either Psychology of Advertising or Elementary Advertising. In many ways it is preferable that both classes precede other study; and for credit in the School of Business Administration that order must be followed. Elementary Advertising and Advanced Advertising Procedure form a continuous one-year sequence covering the basic phases of advertising principles and procedures.

Advanced Advertising Procedure, Retail Advertising, and Direct Mail Advertising should be considered advanced classes of a specialized nature, to be chosen according to the special interest of the student, and requiring a knowledge of the applications of psychology to advertising and the use of advertising as a tool in business.

**Psy. 56 Psychology of Advertising. 3 credits. \$10.**

Analysis of advertising, national and local, from the standpoint of attention, memory, desire, and action; experimental techniques for investigating advertising problems. Of fundamental value to all advertisers. Prerequisite: Psy. 1-2 and Econ. 6-7.

**First Semester**

T 6:20 Campus Psychology 115, Longstaff

**B.A. 88 Elementary Advertising. 3 credits. \$10.**

Covers two important phases of advertising: the place of advertising in business and advertising procedure. Attention to planning an advertising campaign, including market research, appropriations, choice of media, scheduling, preparation of copy, and layout. Prerequisite: B.A. 77 and Psy. 56.

**First Semester**

W 6:20 Campus Vincent 115, Chute

**B.A. 194ex Advanced Advertising Procedure. 3 credits. \$10.**

Problems and case studies, continuing Elementary Advertising with special emphasis on typography and layout. Preparation and criticism of advertisements and of advertising campaigns. During the first half of the course students prepare and set advertisements in the Journalism Department's enlarged typography laboratory in Murphy Hall. Prerequisite: B.A. 88.

**Second Semester**

First half,	Th 6:20	Campus Murphy 311, 315, Barnhart
Second half,	Th 6:20	Campus Vincent 105, Valle

**Retail Advertising. 3 credits for certificate. \$10.**

Practical training in the fundamentals of modern retail advertising. Retail store organization, and the advertising department and publicity division; types of retail advertising and their relation to types of retail stores; planning retail advertising and advertising department procedure; fundamentals of typography, printing, and engraving, illustrated by field trips to newspaper and engraving plants; writing *selling* copy and headlines; layout; newspapers and other media for retailers; the qualifications of a retail advertising person. Prerequisite: consult instructor.

**Second Semester**

W 6:20 Campus Vincent 115, Chute

**Direct Mail Advertising—Sales Letter Writing. 3 credits each semester for certificate. \$10.**

Personal coaching course covering: the vital points in planning campaigns; getting letters and advertising read; getting low-cost inquiries; how to write letters that pull; how to "follow-up" by mail; how to close sales; the "Check Chart" for increasing results; the 5 "must" factors of every mailing. Students work out own advertising and letters with instructor's guidance. The second semester is a continuation of the first semester but can be profitably taken by those who have not had the first semester. No prerequisite.

**First Semester**

M 6:20 Campus Vincent 112, Brownson

**Second Semester**

M 6:20 Campus Vincent 112, Brownson

**Publicity and Public Relations. See page 35.****Radio Script Writing. See page 26.****Salesmanship. See page 68.**

**BUSINESS ADMINISTRATION****B.A. 89 Business Organization and Management. 3 credits. \$10.**

Survey of the procedures used and the problems of co-ordination and control for both large and small business organizations. Commercial, office, financial, and marketing aspects are considered in conjunction with production operations. Operating economy is conceived as the effective utilization of the investment in facilities, materials, labor, and personnel to serve available markets, with emphasis on functional management and internal organization, budgetary cost control, and analysis techniques, and the anticipation of management problems involved in planning. Consideration is also given to job analysis, incentives, and their relation to cost and price structures. No pre-requisite.

**First Semester**

Th 6:20 Campus Vincent 301, Cummins

**B.A. 170 Management Control of Operations. 3 credits. \$10.**

The place in management, and the techniques, of work simplification, time and motion study; the setting of standards of performance and basic wage rates and incentives; and the review of results through cost control and budget methods. The problems are approached from the executive rather than from the technical aspects of increased productivity, such as the effect on employee relations, collective agreements, and internal organization. Laboratory practice in office and store applications as well as factory operations. Motion picture demonstrations. Students should plan to keep the class evening open for extended practice and observation. Prerequisite: B.A. 89 or consent of instructor.

**Second Semester**

Th 6:20 Campus Vincent 301, Cummins

**Hotel Organization and Operation. No credit. \$10.**

This course will deal with the fundamentals of hotel organization and operation. Instruction will be given by qualified experts, through lectures, demonstrations, and discussion.

First semester: types of hotels; location; site; patronage; promotion and methods of advertising; organization charts and their application; front office practice; legal terms; credit and protective departments; catering and food service; preparation of food; steward's department; beverage service.

Second semester: service departments; sales and convention promotion; housekeeping and laundry management; interior decorating; study of hotel textiles; hotel inspection tours; hotel law; personnel; employer-employee relations.

No prerequisite but second semester students will be expected to have taken the work of the first semester.

**First Semester**

M 8:05 Campus Vincent 1, Fisk and  
others

**Second Semester**

M 8:05 Campus Vincent 1, Fisk and  
others

**BUSINESS ENGLISH****lex Business English. 3 credits for certificate. \$10.**

A practical class for business people who recognize the value of good English in business and in general writing and conversation. Various kinds of business writing are studied with some attention to letter types; application of good grammar and correct forms in all business writing. No prerequisite.

**First Semester**

M 6:20 Campus Folwell 201, Randel  
W 8:05 St. P. Ext. Center 220, Guthrie  
Th 6:20 Campus Folwell 101, Haga

**Second Semester**

M 8:05 Campus Folwell 101, Guthrie

**2ex Business Correspondence.** 3 credits for certificate. \$10.

A more advanced class with less emphasis on grammar and mechanics. Practical adaptations of successful letter writing to specialized correspondence under such headings as: executive problems, personnel, and financial. Each student will work out an individual communications project related to his own most imperative business needs. No prerequisite, but Business English or its equivalent is, for practical reasons, strongly recommended.

**Second Semester**

M 6:20 Campus Folwell 101, Randel  
W 8:05 St. P. Ext. Center 220, Haga

**BUSINESS LAW**

**B.A. 51-52-53†, 54 Business Law.** 3 credits each semester; 51, 52, and 53 must be completed before credit for degree is granted; 51, 52, and either 53 or 54 for extension certificate. \$10 plus \$1 materials fee.

Comprehensive course in the fundamental principles of law for the business and professional man. B.A. 51: contracts—formation, operation, transfer, discharge; agency—creation, nature, and terms of the relation, rights, and liabilities of the parties. B.A. 52: organization, management, and responsibility of associations; business trusts; partnerships and corporations; bankruptcy. B.A. 53: personal property and transactions concerning it; law of sales, of bailments, and the Uniform Negotiable Instruments and Bills of Lading acts. B.A. 54: nature and classification of real estate; deeds and conveyances; landlord and tenant; recording and abstracting; Torrens titles; liens and mortgages; wills, probating of estates, and duties of administrators and executors. No prerequisite but B.A. 51 should precede other classes.

**First Semester**

51 M 6:20 St. P. Ext. Center 212,  
Jackman  
T 6:20 Campus Vincent 207, Jackman  
W 6:20 Campus Vincent 207, Jackman  
52 M 8:05 St. P. Ext. Center 212,  
Jackman  
T 6:20 Campus Vincent 112, Chapin  
53 T 8:05 Campus Vincent 207, Jackman

**Second Semester**

51 M 6:20 St. P. Ext. Center 216, Jackman  
T 8:05 Campus Vincent 207, Jackman  
53 M 8:05 St. P. Ext. Center 216, Jackman  
T 6:20 Campus Vincent 207, Jackman  
54 T 8:05 St. P. Ext. Center 214, Chapin  
W 6:20 Campus Vincent 207, Jackman

**ECONOMICS**

**Econ. 3 Elements of Money and Banking.** See page 66.

**Econ. 5 Elements of Statistics.** See page 69.

**Econ. 6-7† Principles of Economics 1-2.** 3 credits each semester. \$10.

Fundamental principles underlying the economic activities of society; utility and valuation; prices and the cost of production; the factors of production; division of labor and its relation to the development of industry; wages, rent, interest; capitalization, enterprise, business profits. Fundamental to the study of any business subject. No prerequisite.

**First Semester**

6 M 6:20 St. P. Ext. Center 214, Myers  
Th 8:05 Campus Vincent 207, Graves

**Second Semester**

6 W 6:20 Campus Vincent 210, Graves  
7 M 6:20 St. P. Ext. Center 214, Myers  
Th 8:05 Campus Vincent 207, Graves

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

**Econ. 84 Comparative Economic Systems. 3 credits. \$10.**

An impartial analysis of the basic principles of the opposing systems of economics (modified individualism, state socialism, communism and the Russian experiment, fascism); an examination of the application of each in practice; comparative appraisal of the effect of each upon individuals, economic classes, and institutions. Prerequisite: Econ. 6-7.

**First Semester**

T 6:20 Campus Vincent 112, Myers

**Econ. 103-104† Advanced Economics. Not offered 1941-42.****Agr. Econ. 126 Economics of Consumption. 3 credits. \$10.**

An examination of the economic order from the viewpoint of the consumer. The distribution of income and its influence upon expenditures. The demand for particular commodities and manipulation by advertising and salesmanship. Consumer protection from monopolies and low quality products. Discussion of other topics, such as costs of marketing, consumers' co-operatives, the individual insurance and investment program, and public policy and consumption. Prerequisite: Econ. 6-7.

**First Semester**

Th 6:20 Campus Vincent 205, Waite

**Agr. Econ. 131 Market Prices of Agricultural Products. 3 credits. \$10.**

The variations in the prices of the principal agricultural products and the factors underlying these fluctuations. The organization of the agricultural markets and their influence upon price. Seasonal movements of prices, future trading, area differences in prices, price policies of agricultural marketing co-operatives, government programs, and their influence on prices. Simple statistical techniques used in price analysis. Prerequisite: Econ. 6-7.

**Second Semester**

Th 6:20 Campus Vincent 205, Waite

**Econ. 140 The Co-operative Movement. 3 credits. \$10.**

The underlying principles of organization and operation of co-operatives; advantages and disadvantages of the co-operative form of economic organization; consumers' co-operatives; producers' co-operatives; the origin and present status of the movement. Prerequisite: Econ. 6-7.

**Second Semester**

T 6:20 Campus Vincent 112, Myers

**Econ. 149 Business Cycles. 3 credits. \$10.**

A critical examination of business cycle theory, with a discussion of proposed methods for eliminating or moderating industrial fluctuation. The relation of business cycles or industrial fluctuations to: the wage system; the influence of machine technique; crop fluctuations; wars, tariffs, and other "irregular" factors; the distribution of wealth; the problem of "purchasing power"; private profit and "competition"; effect of monopoly. Progress and stability; programs of taxation and public works as proposed remedies; possibilities under socialism. Prerequisite: Econ. 141 or B.A. 142, or consent of instructor.

**Second Semester**

W 6:20 Campus Vincent 211, Marget

**Econ. 165 Economics of Public Utilities. Not offered 1941-42.****Econ. 166 International Economic Problems. 3 credits. \$10.**

The economic situation before and following World War I; reparations and war debts; unstable factors in the 1920's in relation to the depression beginning in 1929; the economics of conquest (raw materials, population,

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

colonies); the export of capital; selected problems in international economic policy. Prerequisite: Econ. 6-7.

**First Semester**

W 6:20 Campus Vincent 211, Marget

**American Economic History.** See page 32.

**FINANCE**

**Econ. 3 Elements of Money and Banking.** 3 credits. \$10.

The nature and functions of money and credit; the development of our monetary system with a critical examination of the reasons for the various changes; a study of commercial banking and the Federal Reserve System; the form and functions of the other types of financial institutions and security exchanges; an evaluation of recent changes resulting from legislation or revised business practices. No prerequisite.

**First Semester**

M 6:20 Campus Vincent 115, Stehman  
T 6:20 St. P. Ext. Center 218, Kozelka

**B.A. 58 Elements of Public Finance.** 3 credits. \$10.

Public expenditures, revenues, debts, budgets; special attention to tax principles, practices, and burdens. Adapted to citizens generally, but of special interest to public officials. Required of all candidates for degree in business. Prerequisite: Econ. 6.

**Second Semester**

Th 8:05 Campus Vincent 115, Borak

**B.A. 142 Advanced Money and Banking.** 3 credits. \$10.

The problems of a central bank and the theory of the value of money. Includes control of reserves, providing a scientific currency, regulation of credit, fluctuations of the general price level—their causes and possible reduction. Prerequisite: Econ. 3, 6-7.

**Second Semester**

W 6:20 Campus Vincent 221, Tow

**B.A. 146 Investments.** Not offered 1941-42.

**B.A. 148 The Securities Market.** Not offered 1941-42.

**B.A. 155 Corporation Finance.** 3 credits. \$10.

Forms of business organization; types of corporate securities and their uses; raising capital; surplus and dividend policies; holding companies, mergers, receiverships, and reorganizations; relation of the corporation to creditors, minority stockholders, and the public; recent legislation affecting corporate practices. Prerequisite: Econ. 3, 6-7.

**Second Semester**

M 6:20 Campus Vincent 115, Stehman

**INSURANCE**

**3ex General Insurance.** 3 credits for certificate. \$10.

A basic course in the principles and practices involved in underwriting the various forms of insurance coverage, property and casualty in particular. Prerequisite to all other insurance classes. No prerequisite.

**First Semester**

T 6:20 Campus Vincent 2, Ware

**B.A. 59 Life Insurance.** 3 credits. \$10.

The economic significance of life insurance; types of policy and analysis of the policy contract; principles underlying the determination of premiums and reserves; industrial, fraternal, and group insurance. Prerequisite: Econ. 6-7.

**Second Semester**

M 8:05 Campus Vincent 112, Specht

**B.A. 60 Fire and Marine Insurance. 3 credits. \$10.**

Historic background of fire and marine insurance; insurance carriers; standard policy; state regulation and supervision; agency viewpoint of rate making; inland marine forms and coverages. Prerequisite: Econ. 6-7.

**First Semester**

M 6:20 Campus Vincent 2, Law

**B.A. 61 Casualty Insurance. 3 credits. \$10.**

The risks of insurance coverages, policy provisions, and methods of rating in the more important lines of casualty insurance—accident and health, employer's liability, workmen's compensation, automobile, robbery and theft, plate glass, and miscellaneous damage types. Prerequisite: Econ. 6-7.

**Second Semester**

M 6:20 Campus Vincent 6, McGee

**Suretyship. No credit. \$10.**

A basic course outlining the history of the business and its development, and covering all types of bonds—fidelity, including blanket bonds, court, fiduciary, construction and supply, license and permit, public official, depository, and miscellaneous bonds. No prerequisite.

**First Semester**

T 6:20 Campus Vincent 105, Clark

**LABOR AND PERSONNEL RELATIONS****Econ. 161 Labor Problems and Trade Unionism. 3 credits. \$10.**

Employment; hours; wages; extent and stronghold of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. Special emphasis on the current proposals for industrial recovery and the re-employment of labor. Prerequisite: Econ. 6-7.

**First Semester**

M 8:05 Campus Vincent 205, Yoder

**Econ. 162ex Labor Movements. 3 credits. \$10.**

An analysis of the structure, operation, and functions of American labor unions and an interpretation of leading labor movements in the United States and Europe. Prerequisite: Econ. 161.

**Second Semester**

M 6:20 Campus Vincent 112, Lindblom

**Econ. 164 Labor Legislation and Social Insurance. 3 credits. \$10.**

The economic aspects of labor legislation, including minimum wage laws; hours legislation; factory acts; accident, health, old age, and unemployment insurance; mothers' pensions. Prerequisite: Econ. 161 or consent of instructor.

**Second Semester**

Th 6:20 St. P. Ext. Center 217, Schmidt

**B.A. 167 Personnel Administration. 3 credits. \$10.**

Evaluation of managerial policies and devices for the control of personnel; determination of labor needs; methods of dealing with workers; selective devices; training and safety programs; compensation; collective bargaining; governmental personnel programs. Prerequisite: Econ. 161.

**Second Semester**

M 8:05 Campus Vincent 205, Yoder



## MARKETING AND MERCHANDISING

**Salesmanship.** 3 credits for certificate. \$10.

Principles underlying salesmanship—buying motives; pre-approach, approach, the interview, meeting objections, closing the sale; demonstration sales. Repeated second semester. No prerequisite.

**First Semester**

M 8:05 Campus Vincent 115, Faragher  
Th 8:05 Campus Vincent 115, Faragher

**Second Semester**

M 8:05 Campus Vincent 115, Faragher

**Purchasing Policies and Methods.** Not offered 1941-42.

**B.A. 67 Retail Store Management for Pharmacies.** Not offered 1941-42.

**B.A. 68 Sales Management.** Not offered 1941-42.

**B.A. 69 Retail Store Merchandising and Management.** 3 credits. \$10.

Organization and control of retail stores' buying, selling and services; buying and sales budgets; sales planning; sales promotion and display; stock and expense control; location, layout, and equipment; store policy; personnel. (Case studies, problems, and discussions. Policies and procedures of both large-scale and small-type retail stores will be studied.)

**Second Semester**

T 6:20 Campus Vincent 105, Chute

**B.A. 77 Survey in Marketing.** 3 credits. \$10.

Survey course including descriptive analysis of: (1) marketing institutions and their control; (2) market areas; (3) marketing costs; (4) the operation of supply and demand in marketing. Repeated second semester. Prerequisite: Econ. 6-7.

**First Semester**

T 6:20 St. P. Ext. Center 214, Pickett

**Second Semester**

T 6:20 Campus Vincent 6, Pickett

**Retail Credits and Collections I-II.** 3 credits each semester for certificate. \$10.

The nature and types of credit and of credit instruments with special emphasis on retail credit; sources of credit information; qualifications and work of the credit manager; rating agency and retail credit bureau; collection follow-up; credit limits and control. Second semester devoted to organization and operation of retail collection departments; collection policies and methods; planning collection letters; installment collections; locating "skips"; use of attorneys and collection agencies. Conducted jointly by the instructors and several experienced retail credit men of the Twin Cities. No prerequisite.

**First Semester**

I T 6:20 Mpls. N. W. Bank Bldg. 664,  
Chute and others

**Second Semester**

II T 6:20 Mpls. N. W. Bank Bldg. 664,  
Thrush and others

**Wholesale Credit and Collection Curriculum.** In co-operation with the National Institute of Credit.

The University of Minnesota co-operates with the Minneapolis and St. Paul chapters of the National Institute of Credit in a program of educational training leading toward the awards of associate and fellow of the National Institute of Credit. The National Institute of Credit is the educational branch of the National Association of Credit Men. Course registrations may be made

through the association offices, 420 Rand Tower, Minneapolis, and 801 Guardian Building, St. Paul. Registration in the National Institute of Credit is required for credit toward awards of associate and fellow. Transfer credit may be applied for courses completed previously in recognized colleges, up to 50 per cent of the requirements listed below.

The following program has been approved as fulfilling the requirements for awards of associate and fellow of the National Institute of Credit:

<b>Classes in Association Curriculum</b>	<b>Equivalent Extension Classes</b>
<i>Associate Award</i>	
Economics.....	Econ. 6-7 Principles of Economics
Fundamentals of Accounting.....	Econ. 20L-25L Principles of Accounting
Business English.....	2ex Business Correspondence
Credits and Collections.....	To be announced
<i>Fellow Award (in addition to courses above)</i>	
Business Law.....	B.A. 51-53 or special course which may be announced later
Marketing.....	B.A. 77 Survey in Marketing
Public Speaking.....	Beginning Practical Speech Making
Problems of Credit Management.....	To be announced

**STATISTICS**

**Econ. 5 Elements of Statistics.** 3 credits. \$10.

The principles of statistical methods applied to business; collection, tabulation, and interpretation of statistical data; averages, ratios, errors, index numbers, graphs, and charts. No prerequisite.

**First Semester**

T 8:05 St. P. Ext. Center 218, Kozelka  
 W 6:20 Campus Vincent 105, Graves

**B.A. 112 Business Statistics.** 3 credits. \$10.

The technique of time series analysis; methods of determining normal or trend values; methods of measuring seasonal variation and adjustment of data for seasonal fluctuation; measurement of degree of relation between time series, graphically and by correlation technique; analysis and comparison of index numbers of local and national business conditions. Prerequisite: Econ. 5, or 14, or equivalent.

**Second Semester**

W 8:05 Campus Vincent 115, Kozelka

**B.A. 180F Senior Topics: Statistics.** Not offered 1941-42.

**TRAFFIC AND TRANSPORTATION**

**B.A. 71-72 Transportation: Services and Charges I and II.** 3 credits each semester. \$10.

The rail, water, air, and highway transportation facilities, services, rates, and laws, and their relation to business establishments; problems in handling freight, express, and parcel-post shipments; scope, selection, and use of the facilities and services of common carriers; rate structures; problems involving freight classification and use of tariffs. 71 to precede 72. Prerequisite: Econ. 6-7.

**First Semester**

71 Th 6:20 Campus Vincent 1,  
 Nightingale

**Second Semester**

72 Th 6:20 Campus Vincent 1,  
 Nightingale

**B.A. 80-81 Senior Topics: Transportation. 3 credits each semester. \$10.**

Advanced study of tariffs and tariff construction, of rate structures, and of auxiliary services, including problems thereon. Analysis of important current cases and decisions affecting shippers and carriers. Prerequisite: 71-72.

**First Semester**

80 M 6:20 Campus Vincent 6, Nightingale

**Second Semester**

81 M 6:20 Campus Vincent 2, Nightingale

**Advanced Traffic and Transportation I and II. 3 credits each semester for certificate. \$10.**

Advanced consideration of regulatory state and federal laws governing rail and highway transportation. Detailed study of highway rates and problems. Attention to practice and procedure before rate and classification committees, state commissions, and the Interstate Commerce Commission. Preparation of informal, formal, and investigation and suspension cases before regulatory commissions. Prerequisite: B.A. 71-72 or equivalent.

**First Semester**

I F 6:20 Campus Vincent 2, Mann

**Second Semester**

II F 6:20 Campus Vincent 2, Mann

## ENGINEERING

In this department two kinds of classes are offered for two rather distinct types of students. Classes of regular college standing are offered for those who wish to accumulate as much of the work of the regular engineering course of study as they can while regularly employed. These classes correspond to those given to full-time engineering students, and are based on the same prerequisites. They are offered for those who wish to be thoroly prepared to do the maximum work demanded, and perhaps ultimately to become candidates for a degree. For those who do not seek an engineering degree but wish practical preparation for some phase of engineering procedure, other classes are offered.

Classes of the second kind are indicated in the program as being without prerequisites, for the most part, and either without credit or with credit toward an extension certificate only. They are offered freely to all who have the appropriate interest, for such value as they may have for the student. Each such class is usually complete in itself, except where two classes, in successive semesters, make up a unit. These classes are not offered as equivalents for any part of the required work of the Institute of Technology.

### Certificates

The General Extension Division certificate in engineering is issued as evidence of the completion of an organized program of study in technological subjects. While not the equivalent of a degree, it represents a comprehensive yet concentrated training in several branches of study which will be found valuable in many phases of industry and in activities which utilize engineering ability. The program embraces a core of fundamental subjects, including all the mathematics required for a degree, and the opportunity for specialization in one of the several engineering fields. The requirements are as follows:

1. Each candidate must complete a total of 90 credits with an average grade of C in technological subjects, of which the following are required:

Mathematics:	Credits
9 Higher Algebra .....	5
11 College Algebra .....	5
12 Trigonometry .....	5
13 Analytical Geometry .....	5
24 Differential Calculus .....	5
25 Integral Calculus .....	5
Engineering Drawing 1-2 .....	6
Technical Mechanics .....	5
Strength of Materials .....	5
<hr/>	<hr/>
Total .....	46

2. Each candidate will be required to complete additional classes totaling approximately 30 credits in one of the separate fields of Engineering—Aeronautical, Architectural, Chemical, Civil, Electrical, Mechanical.

3. The remaining credits, approximately 14, may be completed either in optional courses within the chosen field, or in approved elective courses in one of the allied fields. Selection of classes in which to earn these credits should be made with the advice and approval of the Students' Work Committee.

4. Upon the completion of an approved 45 credits a preliminary certificate will be informally issued to be used for such purposes as the candidate may desire. The approval of classes which will yield these 45 credits must be had from the Students' Work Committee.

### Degrees

Credits earned in these classes are accepted, without a special examination, toward degrees in the Institute of Technology whenever the student is qualified by admission and prerequisite study. When a student is desirous of determining his status with respect to a degree he should consult the chairman of the Advanced Standing Committee of the particular unit in which he will do his major work—that is, the College of Engineering and Architecture, the School of Chemistry, or the School of Mines and Metallurgy. The requirements for degrees in these several units are set forth in the Bulletin of the Institute of Technology.

## GENERAL ENGINEERING

**Consultation Period.** No fee.

The classroom is kept open during this period to afford opportunity to students of any extension classes in technological subjects to get together and help each other with problems which develop in class and on the job.

#### First Semester

F 6:30 Campus Folwell 113

#### Second Semester

F 6:30 Campus Folwell 113

**G.E. 70 Use of the Engineer's Slide Rule.** 1 credit for certificate. \$5.

Theory and computation practice necessary for those who wish to use the slide rule in ordinary office computations. Meets one hour weekly. No prerequisite.

#### First Semester

T 7:00 Campus Main Eng. 205, Boon

**G.E. 81 Cost Estimating.** 3 credits for certificate. \$10.

Blueprint reading, quantity survey, mensuration; estimates of concrete, brick, timber, and steel structures. No prerequisite.

#### First Semester

T 8:05 Campus Main Eng. 217, Boon

## AERONAUTICAL ENGINEERING

**Aircraft Engines 1-2.** 3 credits each semester for certificate. \$10.

Types of engines and their development; calculation of size and horse power; use of dynamometers and torque stands; aviation gasoline, specifications and tests, octane numbers; principles of ignition, magnetos, starters, carburetors, combustion; modern operation systems, performance; oils and oil testing; the aviation Diesel. Lectures and laboratory tests. No prerequisite.

#### First Semester

1 W 7:30 Campus Oak St. Lab.,  
Robertson

#### Second Semester

2 W 7:30 Campus Oak St. Lab.,  
Robertson

**Aeronautics I: Airplane Construction.** 3 credits for certificate. \$10.

Nomenclature; theory of lift and drag; wind tunnel; airfoil characteristics; airplane performance; stability and control; types of airplanes; demonstration and inspection of airplane and its parts; materials and their properties; principles in propeller theory. Prerequisite: elementary mathematics.

#### First Semester

I T 7:30 Campus Armory 105, Akerman

**Aeronautics II: Elementary Navigation and Meteorology.** 3 credits for certificate. \$10.

Navigation instruments; principles of celestial navigation; laying out and checking course; dead reckoning; radio use; magnetic compass and its use; maps and charts; the atmosphere and clouds; reading of weather maps. Prerequisite: elementary mathematics.

**Second Semester**

II T 7:30 Campus Armory 105, Akerman

**Aeronautical Drafting.** See page 74.

## AIR CONDITIONING

See pages 78-79.

## ARCHITECTURE

See pages 17-18.

## ART

See pages 16-18.

## CHEMISTRY

See pages 20-21.

## CIVIL ENGINEERING

**11 Plane Surveying.** Not offered 1941-42.

**21 Curves and Earthwork.** Not offered 1941-42.

**33 Elementary Structural Design.** Not offered 1941-42.

**51 Highways and Pavements I.** Not offered 1941-42.

**52 Highways and Pavements II.** 3 credits. \$10.

Elementary economics; location, construction, and maintenance of highways and pavements; road building materials and their methods of testing, with laboratory practice. Begins January 7 and continues 17 weeks. Prerequisite: C.E. 12 Surveying or equivalent.

**First Semester**

W 7:30 Campus Exp. Eng. 215, Lang

**141-142 Reinforced Concrete and Concrete Design.** 3 credits each class. \$10.

141: Principles of reinforced concrete; theory and design of beams, slabs, and columns; use of transformed sections, formulae, tables, and diagrams; discussion and application of recent specifications. Begins November 11 and continues 17 weeks.

142: Continuation of 141; application of theory of continuity to the analysis of structural frames; design of reinforced concrete buildings, retaining walls, etc. Begins November 13 and continues 17 weeks.

Prerequisite: consult instructor.

**First Semester**

141 T 7:30 Campus Main Eng. 104,  
Hughes

142 Th 7:30 Campus Main Eng. 104,  
Hughes

## DRAWING AND DESCRIPTIVE GEOMETRY

### 1-2 Engineering Drawing. 3 credits each semester. \$10.

Elements of drafting, representation, geometry, sketching, lettering, working drawings, conventions, tracing. Auxiliary views, multiple projection, detail and assembly drawings. Students may enter either class either semester. No prerequisite.

First Semester		Second Semester	
1 W 7:30	St. P. Mechanic Arts High 101, Dow	2 W 7:30	St. P. Mechanic Arts High 101, Dow
Th 7:30	Campus Main Eng. 201, French	Th 7:30	Campus Main Eng. 201, French

*N.B.—Three credits given only for completion of entire work of a semester; 1½ credits may be given for satisfactory completion of a half of a semester's work, with another registration necessary for the completion of the remainder.*

### 3 Descriptive Geometry. 3 credits. \$10.

Elementary course in the methods of representation, correlated in part with analytical geometry. Graphical and algebraic solutions. Lectures, demonstrations, and drafting. Prerequisite: Draw. 2, M.&M. 11.

First Semester	
W 6:20	Campus Main Eng. 201, Cruzen

### 20 Advanced Mechanical Drawing. No credit. \$7.

Working drawings, gearing, cams, developments, multiple auxiliary views, special projections. Repeated second semester. Prerequisite: Draw. 1.

First Semester		Second Semester	
W 7:30	St. P. Mechanic Arts High 101, Dow	W 7:30	St. P. Mechanic Arts High 101, Dow

### 22 Structural Drafting. 2 credits. \$7.

Details of fabrication of beams, girders, columns, trusses, etc.; material bills. Repeated second semester. Prerequisite: Draw. 1.

First Semester		Second Semester	
Th 7:30	Campus Main Eng. 201, French	Th 7:30	Campus Main Eng. 201, French

### 29 Aeronautical Drafting. 2 credits. \$7.

Detail, assembly, and layout drawings. Standard practices in the aircraft industry. Army-Navy standards and specifications; tolerances and allowances; graphical integration. Prerequisite: Draw. 2 or consent of instructor.

First Semester	
W 6:20	Campus Main Eng. 101, Cruzen

### 38 Reading Drawings. No credit. \$10 plus \$1 materials fee.

Orthographic projection, pictorial drawings, and technical sketching. Calculations of areas, volumes, and weights; tabulations of quantities from working drawings. No prerequisite.

First Semester	
M 7:30	Campus Main Eng. 101, Potter

### 52 Alignment Charts. 3 credits. \$10.

Theory and construction of alignment charts for the solution of engineering formulae having three or more variables. Prerequisite: engineering drawing and trigonometry.

First Semester	
T 7:30	Campus Main Eng. 107, Levens

For other drawing classes see pages 17-18.

**ELECTRICAL ENGINEERING**

**Fundamentals of Electrical Engineering.** 5 credits each semester for certificate. \$17.

Study of the fundamentals of electricity and magnetism; direct current and alternating current circuits; operating characteristics and industrial applications of direct current and alternating current machinery. Lectures, demonstrations, and laboratory. No prerequisite.

**First Semester**

TTh 7:30 Campus Elec. Eng. 237,  
Johnson, Caverley

**Second Semester**

TTh 7:30 Campus Elec. Eng. 237,  
Johnson, Caverley

**Advanced Classes:**

Beginning in 1942-43, an advanced sequence in electrical engineering will be offered. This sequence will commence with E.E. 11-16 Elements of Electrical Engineering (prerequisite: calculus) in 1942-43 and will continue in succeeding years through 111-116 Junior Electrical Engineering and 121-126 Senior Electrical Engineering.

**132-134-136 Electrical Design.** 3 credits each semester. \$10.

The design of direct current generators and motors, alternating current transformers, generators, and synchronous motors. Prerequisite: 121-126.

**First Semester**

132 W 7:30 Campus Elec. Eng. 237,  
Kuhlmann

**Second Semester**

134 W 7:30 Campus Elec. Eng. 237,  
Kuhlmann

*N.B.—136 will be offered 1942-43.*

**M.E. 40-41 Heat Engines.** 3 credits each semester. \$10.

Properties of steam; principles of operation of steam machinery; fuels, combustion, and smoke prevention; construction, operation, and testing of engines, turbines, boilers, condensers, pumps, and power plant equipment. Selection of equipment for different types of plants. Prerequisite: Physics 7 or 23.

**First Semester**

40 T 7:30 Campus Exp. Eng. 110, Shoop

**Second Semester**

41 T 7:30 Campus Exp. Eng. 110, Shoop

*N.B.—The third class in the M.E. 40-41-55 sequence is M.E. 55 Internal Combustion Engines; it will be offered in 1942-43.*

**INDUSTRIAL ENGINEERING**

**M.E. 171 Production Control.** 3 credits for certificate. \$10.

Detailed study of basic principles underlying economical production of manufactured goods; production planning and control; standardization; stores and stock control; purchasing; cost finding; inspection systems. Prerequisite: shop experience.

**First Semester**

T 6:20 Campus Mech. Eng. 202, Laitala

**M.E. 174 Motion and Time Study.** 3 credits for certificate. \$10.

Motion and time study as a tool in industrial management. Particular emphasis on cost reduction due to better methods; process and operation analysis; micromotion studies; lectures, laboratory studies, and problems. No prerequisite.

**Second Semester**

T 6:20 Campus Mech. Eng. 202, Laitala



## MATHEMATICS AND MECHANICS

*N.B.—The numbers of these courses are those used by the Institute of Technology.*

**Shop Mathematics I-II.** 3 credits each semester for certificate. \$10 plus \$1 materials fee.

Practical course for shop men in defense or other machine work embracing arithmetic from fractions through decimals, percentage, proportion; problems in areas, volumes, weights of materials; screw threads, gears, metric system, logarithms, elementary algebra and geometry from a shop man's point of view. Valuable also to the teacher of applied mathematics under the Smith-Hughes or defense education acts.

**First Semester**

I M 7:30 Campus Main Eng. 104

**Second Semester**

II M 7:30 Campus Main Eng. 104

**Elementary Algebra.** Credit toward entrance. \$10 plus \$1 materials fee.

Elements of algebra to quadratic equations. Both semesters necessary. No prerequisite.

**First Semester**

M 7:30 Campus Main Eng. 106

**Second Semester**

M 7:30 Campus Main Eng. 106

**Mathematics Review.** Not offered 1941-42.

**Solid Geometry.** Credit toward entrance. \$10.

Standard theorems and exercises; practice in special proofs and original exercises. Class will finish December 15; extra sessions arranged to make semester's work complete. Prerequisite: plane geometry.

**First Semester**

M 6:20 Campus Main Eng. 136, Schuck

**9 Higher Algebra.** 5 credits. \$17.

A review and collegiate treatment of the topics of elementary algebra, which is prerequisite. Not open for credit to those who present higher algebra for entrance to college. Repeated second semester. Prerequisite: Elementary Algebra.

**First Semester**

Th 7:00 Campus Main Eng. 136, Peebles  
Th 7:00 St. P. Ext. Center 219, Dow

**Second Semester**

Th 7:00 Campus Main Eng. 205, Turriffin

**11 College Algebra.** 5 credits. \$17.

Quadratic equations; equations in the quadratic form; simultaneous quadratic equations; graphical representation; progressions; mathematical induction; binomial theorem; permutations; combinations; probability; determinants; theory of equations. Prerequisite: M.&M. 9.

**Second Semester**

Th 7:00 Campus Main Eng. 104, Peebles  
Th 7:00 St. P. Ext. Center 219, Dow

**12 Trigonometry.** 5 credits. \$17 plus \$1 materials fee.

Logarithms and plane trigonometry. Repeated second semester. Prerequisite: M.&M. 9.

**First Semester**

Th 7:00 Campus Main Eng. 106

**Second Semester**

Th 7:00 Campus Main Eng. 203, Siler

**13 Analytical Geometry, Plane and Solid.** 5 credits. \$17 plus \$1 materials fee.

Elements of plane analytical geometry including conic sections; brief introduction to solid analytical geometry. Prerequisite: trigonometry.

**Second Semester**

Th 7:00 Campus Main Eng. 107

**24 Differential Calculus.** 5 credits. \$17.

Limit; derivative; simple applications of derivative; maxima and minima; differentials; rates; change of variable; radius of curvature; mean value; indeterminate forms; partial differentiation; series. Prerequisite: M.&M. 13.

**First Semester**

T 7:00 Campus Main Eng. 106

**25 Integral Calculus.** 5 credits. \$17.

Expansion of function; Taylor's theorem; standard elementary forms; definite integral; rational fractions; integration by substitution, by parts; reduction formulas; integration of processes of summation; double and triple integration; elementary ordinary differential equations. Prerequisite: M.&M. 24.

**Second Semester**

T 7:00 Campus Main Eng. 106

**M.&M. 26 Technical Mechanics—Statics.** 5 credits. \$17.

This class deals with the following aspects of statics: characteristics of a force, parallelogram law, moments, resultants, equilibrium, friction, graphical methods, work, and theory of the moment of inertia.

**First Semester**

Th 7:00 Campus Main Eng. 107, Teeter

**M.&M. 127 Technical Mechanics—Dynamics.** 5 credits. \$17.

This class deals with the following aspects of dynamics: mass, acceleration, governors, power, momentum, and the theorem of Coriolis. Prerequisite: M.&M. 26.

**Second Semester**

Th 7:00 Campus Main Eng. 107, Teeter

**M.&M. 128a-128b Strength of Materials.** 3 credits first semester, \$10; 2 credits second semester, \$7.

Mechanical and elastic properties of materials of construction; beams, shafts, and columns; hollow cylinder rollers; plates, curved bars, and springs; combined stresses, dynamic stresses, and true stresses. Prerequisite: calculus and technical mechanics.

**First Semester**

128a M 7:00 Campus Main Eng. 205,  
Miller

**Second Semester**

128b M 7:00 Campus Main Eng. 205,  
Miller

**M.&M. 129a-129b Hydraulics.** 2 credits each semester. \$7.

Elements of hydraulics including flow through tubes, pipes, conduits, and rivers; principles of turbines and pumps; open channel flow. Prerequisite: Math. 25.

**First Semester**

129a M 7:00 Campus Main Eng. 107,  
Teeter

**Second Semester**

129b M 7:00 Campus Main Eng. 107,  
Teeter

**M.&M. 143a Hydraulic Laboratory.** 3 credits. \$10.

Experimental and demonstrational work covering tests and calibrations of various common hydraulic machines and measuring devices including turbines, pumps, gages, and meters. Prerequisite: M.&M. 129.

**First Semester**

W 7:00 Campus Exp. Eng. Lab., Ripken

**MECHANICAL ENGINEERING****M.E. 8ex Foundry Practice.** 3 credits for certificate. \$10 plus \$1 materials fee.

A laboratory and lecture course dealing with theory and practice in making cores, and bench and floor molds. Theory and practice in melting, alloying, and casting ferrous and nonferrous metals. No prerequisite.

**First Semester**

T 6:20 Campus Mech. Eng. 153, Holtby

**M.E. 9ex Foundry Control Methods.** 3 credits for certificate. \$10 plus \$2 materials fee.

A laboratory and lecture course dealing with the control of the materials and processes used in commercial foundry practice. Testing of molding sands, foundry melting processes, foundry test bars, specifications. Prerequisite: M.E. 8ex or consent of instructor.

**Second Semester**

T 6:20 Campus Mech. Eng. 153, Holtby

**M.E. 10ex Industrial X Ray.** 3 credits for certificate. \$10 plus \$2 materials fee.

A laboratory course dealing with casting and weld defects. X-ray and gamma-ray inspection of fabricated parts, interpretation of radiographs. No prerequisite.

**First Semester**

W 6:20 Campus Mech. Eng. 120, Holtby

**Diesel Engines (Theory, Construction, and Operation).** 3 credits each semester for certificate. \$10 plus 75 cents materials fee.

Development of the modern Diesel engine; air injection equipment, mechanical injection pumps, fuel spray nozzles, combustion chamber construction, Diesel power generating plants, high speed Diesels for rail cars, busses, tractors, and aircraft; Diesel fuels and the chemistry of combustion; operating equipment and care. Laboratory demonstrations in second semester. A course for operating engineers and others interested in a broad technical study of the Diesel engine. No prerequisite but first semester must precede second.

**First Semester**

Th 7:30 Campus Oak St. Lab., Robertson

**Second Semester**

Th 7:30 Campus Oak St. Lab., Robertson

**M.E. 27 Machine Design.** 3 credits. \$10.

Fundamental principles of design of machine elements; lubrication, theory and application; friction drives, shafts, screws, gears, belts, connectors, springs, flywheels, machine frames, shrink fits. Prerequisite: M.&M. 85 or 128.

**First Semester**

W 7:30 Campus Main Eng. 101, Herrick

**M.E. 121ex Advanced Machine Design.** 3 credits. \$10.

Machine elements as applied to complete machines. Mathematical theory of lubrication; vibration analysis; stress analysis by photoelastic methods; machine design laboratory for experimental studies with instruments such as vibrographs, stroboscopes, polariscopes, balancing machines, etc. Prerequisite: M.&M. 128 and M.E. 27 or equivalent.

**Second Semester**

W 7:30 Campus Mech. Eng. 151, Ryan

**M.E. 50a-b Internal Combustion Engines.** Not offered 1941-42.

**M.E. 65-66ex† Air Conditioning—First year.** 3 credits each semester for certificate. \$10 plus \$1 materials fee.

Especially designed for those engaged in selling, installing, or recommending the modern types of appliances for heating, cooling, humidifying, or otherwise conditioning the air of houses and other buildings. Deals with air vapor mixtures; the wants of the human body; the laws of temperature, pressure, humidity, etc.; the methods of heating, cooling, cleaning, and distributing air and the peculiarities of each; testing and measuring pressure, humidity, etc.,

† Classes marked with a dagger (†) are continuation classes and require the completion of two or three semesters, as indicated, before any credit is given.

and the instruments used; critical evaluation of the results of processes. Mimeographed matter and blueprints issued in lieu of a textbook. No prerequisite but 65 must precede 66.

**First Semester**

65ex W 7:30 Campus Exp. Eng. 110,  
Algren, Jordan, Lund

**Second Semester**

66ex W 7:30 Campus Exp. Eng. 110,  
Algren, Jordan, Lund

**M.E. 67-68ex† Air Conditioning—Second year.** Not offered 1941-42.

**METALLOGRAPHY**

**1-2ex Metallography and Heat Treatment of Iron and Steel.** 3 credits each semester for certificate. \$10.

A beginning course suitable for those engaged in practical heat treatment, in writing specifications, and in purchasing or selling iron or steel. Lectures, demonstrations, and laboratory work in pyrometry, thermal analysis, preparation of alloys, microscopic examination of metal alloys, preparation of photomicrographs. The theory of heat treating, and its relation to practice; welding. No prerequisite but 1 must precede 2.

**First Semester**

1ex M 7:30 Campus Sch. Mines 306,  
Forsyth

**Second Semester**

2ex M 7:30 Campus Sch. Mines 306,  
Forsyth

**PETROLEUM PRODUCTS**

**Petroleum Products and Testing.** 3 credits each semester for certificate. \$10.

A practical class in refining and testing of petroleum products—gasoline, kerosene, gasoline oils, lubricating oils, road oils, etc. Lectures will cover the chemistry of petroleum, the unit process, such as acid treatment, solvent refining, and cracking; the characteristics and properties of the products, with laboratory tests; the significance of the test results. Both semesters necessary for complete results. No prerequisite.

**First Semester**

T 7:30 Campus Exp. Eng. 215, Peterson

**Second Semester**

T 7:30 Campus Exp. Eng. 215, Peterson

**Paint Materials.** 3 credits each semester for certificate. \$10.

This course will consist of a study of pigments, drying oils, and resins used in paints and varnishes. Discussions will cover combinations of the above which yield satisfactory service. The manufacture of raw materials will be covered sufficiently so as to bring out the nature of the desirable and undesirable properties of the material. Items such as covering capacity, hiding power, and bulking value will be discussed. Formulations and yields will be studied. Typical types of paint and varnish failures and corrective measures will be included in the course. No prerequisite.

**First Semester**

Th 7:30 Campus Exp. Eng. 215, Peterson

**Second Semester**

Th 7:30 Campus Exp. Eng. 215, Peterson

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*The Bulletin of the*  
UNIVERSITY of MINNESOTA

The College of Education Announcement  
of Late Afternoon and Saturday Morning Classes  
1941-1942

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Volume XLIV, Number 52

August 14, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

## UNIVERSITY CALENDAR

### *Fall Quarter*

1941			
September	22-26		Examinations for removal of conditions
September	24-27		Freshman Week
September	25-26		Registration, College of Education
September	25-26	}	Registration days for teachers in service*
Sept. 29-Oct.	4		
September	29	Monday	Fall quarter classes begin 8:30 a.m.
October	11	Saturday	Last day for Graduate School registration
November	1	Saturday	Homecoming Day
November	8	Saturday	Dads Day
November	11	Tuesday	Armistice Day; a holiday (except for extension)
November	20	Thursday	Thanksgiving Day; a holiday
December	12-13 and 15-18		Final examination period
December	18	Thursday	Commencement Convocation
			Fall quarter ends 6:00 p.m.

### *Winter Quarter*

1942			
January	2-3		Registration, College of Education
January	2-3, 5-10		Registration days for teachers in service*
January	5	Monday	Winter quarter classes begin 8:30 a.m.
January	17	Saturday	Last day for Graduate School registration
February	12	Thursday	Lincoln's Birthday; a holiday (except for extension)
February	23	Monday	Washington's Birthday; a holiday
March	13-14 and 16-19		Final examination period
March	19	Thursday	Commencement Convocation
			Winter quarter ends 6:00 p.m.

### *Spring Quarter*

March	27-28		Registration, College of Education
March	27-28	}	Registration days for teachers in service*
March	30-April 4		
March	30	Monday	Spring quarter classes begin 8:30 a.m.
April	3	Friday	Good Friday; a holiday (except for extension)
April	11	Saturday	Last day for Graduate School registration
May	9	Saturday	Mothers Day
May	14	Thursday	Cap and Gown Day Convocation
May	30	Saturday	Memorial Day; a holiday (except for extension)
June	5-6 and 8-12		Final examination period
June	7	Sunday	Baccalaureate service
June	12	Friday	Spring quarter ends 6:00 p.m.
June	13	Saturday	Seventieth annual commencement

\* Teachers in service will be allowed to register in the College of Education during the first week of classes without penalty. After that period a late fee of \$2 will be charged.



## DIRECTORY OF ADMINISTRATIVE OFFICERS

(University of Minnesota Telephone—Main 8177)

	Room
W. E. Peik, Dean of the College of Education.....	204Bu
Marcia Edwards, Assistant to the Dean of the College of Education.....	202Bu
Jean Alexander, Chairman, Students' Work Committee.....	206Bu
G. Lester Anderson, Director of Student Teaching.....	103UHS

See list of advisers on pages 14-15.

### GENERAL INFORMATION

The following program of late afternoon and Saturday classes is arranged by the College of Education for teachers in service. Many of the offerings are required subjects in the regular course of training for high school teachers or in the specialized curricula. Students expecting to qualify for a degree should secure a copy of the College of Education Bulletin Announcement of Courses 1940-42, which contains a statement of general requirements for graduation, required courses in majors and minors, descriptions of course content, and the specialized curricula. Students should consult a major adviser as early in their programs as possible. Failure to do so often delays graduation and makes extra work necessary. Graduate students should get the Bulletin of the Graduate School.

The small letter f after a course number indicates that the course is taught in the fall quarter; w indicates winter quarter; s indicates spring quarter.

Bulletin changes and room schedules will be posted each quarter on the official bulletin board outside the door of Room 210 Burton Hall.

The fee for part-time registration in the College of Education is at the rate of \$2.25 per credit for residents and at \$4.50 per credit for nonresidents. In the Graduate School, the credit hour fee is \$2.75 for residents and \$4.50 for nonresidents. Other fees include \$5 deposit and special course fees. If 5 or more credits are taken, an incidental fee of \$8.50 is also required. Auditors pay the same fees as students registered for credit.

### SPECIAL REQUIREMENTS

#### PSYCHOLOGICAL EXAMINATIONS

The psychological examinations, which are general examinations designed to show a student's capacity to pursue professional curricula in education, are required of both classified and unclassified undergraduate students of education, and are considered a prerequisite to graduation. Dates when they are given will be announced at the beginning of fall, winter, and spring quarters. They will also be given on a Saturday afternoon at the beginning of each quarter for teachers in service and others who are unable to attend during the week.

#### QUALIFYING EXAMINATION SCHEDULE

Comprehensive examinations in the subject-matter fields of preparation have been discontinued because studies indicate that the selection of students by the honor point ratio served the purpose equally well. An average of C+ in the major field is required for admission to methods courses and practice teaching. An average of C is required in secondary school teaching minors for all undergraduate students beginning their work for a degree after June 15, 1941. This does not apply to "so-called minors" in elementary education which are merely areas of concentration unless they are used as teaching minors at the junior high school level with the endorsement for junior high school teaching. A comprehensive examination in General English will be required of all students. The English test administered with the psychological tests at the beginning of the junior year forms the General English examination for all students entering at that time. Dates of examinations for students entering at other times are announced at the beginning of each quarter.

## SUMMARY OF CLASS SCHEDULES

On page 16 will be found a summary of class schedules by quarters, days, and hours of offering. This will help to simplify the planning of programs for the year and quarters respectively.

### PROGRAM OF COURSES\* AGRICULTURAL EDUCATION

**Major adviser.**—Professor Field.

No.	Title	Hour	Day	Bldg.	Instructor
AgrEd.238f	Planning and Evaluating Programs of Agricultural Education. Surveying community needs and the establishment of objectives and goals to meet these needs. Developing long-time and annual programs in agricultural education with suggestions as to means of accomplishment and the evaluation of outcomes. (3 cred.; grad.; prereq. 15 hrs. in ed.)	10:00-12:00 1 hr. ar.		301Hr	Mr. Ekstrom

### ART EDUCATION

**Major advisers.**—Professor Ruth Raymond; Instructor Marie Lien

#### GROUP A—DESIGN

##### *Senior College and Graduate Courses*

ArtEd.52Af	Design in Present-Day Home Equipment (2 cred.; jr., sr.) Lect. III Activities ar. (prereq. Art Ed. 1-2-3 or high school art)			S 200J	Mr. Ziegfeld
ArtEd.150E-151E	Understanding Contemporary Design (3 cred.; sr., grad.; prereq. Fine Arts 1 or evidence of fitness) Lect. III Activities ar. 150Ew in commercial fields 151Es in industry			S 200J	Mr. Ziegfeld
ArtEd.153w-154f- 155Es 154f	Art in Society Development of Personality and Its Expression in Costume (3 cred.; sr., grad.)	4:00-5:00		WF 203J M Optional	Miss Raymond
153w	The Scandinavian Home As an Expression of Northern Art (3 cred.; sr., grad.)	4:00-6:00		Th 203J	Miss Lien
155Es	The Plastic Arts (painting emphasized). Students expecting to register in 155 should consult Mr. Torbert about prerequisite reading (3 cred.; sr., grad.)	4:00-6:00		T 203J	Mr. Torbert

#### GROUP B—HANDCRAFTS

##### *Senior College Course*

ArtEd.81Af-Bw	Techniques of Puppetry (2 cred. a qtr.; prereq. consult major adviser)	III-IV		S 203J	Mrs. Meader
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#### GROUP C—REPRESENTATION

##### *Junior College Course*

ArtEd.23f,w	Composition Clinic (2 cred.; prereq. evidence of fitness)	I-II		S 207J	Mr. Torbert
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\* To get this bulletin out early it was necessary to leave a number of hours and classrooms to be arranged. These will be announced in the Teachers Bulletin issued the first week of school.

No.	Title	Hour	Day	Bldg.	Instructor
<i>Senior College Courses</i>					
ArtEd.61,62,63f,w,s	Painting (2 cred. each)	I-IV	S	207J	Miss Lutz
ArtEd.66,67,68f,w,s	Painting (Continuation of 61, 62, 63)	I-IV	S	207J	Miss Lutz
ArtEd.124E-125E-126Ef,w,s	Advanced Painting (2 to 6 cred.)	I-IV	S	Ar	Miss Lutz

### GROUP D—APPRECIATION

For History of Art see offerings in Fine Arts.

#### *Senior College and Graduate Course*

ArtEd.153w-154f-155Es	Art in Society (See Group A)
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### GROUP E—PROFESSIONAL COURSES

#### *Senior College and Graduate Courses*

ArtEd.183Es	Philosophy of Art Education (3 cred.; sr., grad.)	4:00-5:00	MWF	203J	Miss Raymond
ArtEd.185s	Types of Art Instruction II (3 cred.; sr., grad.)	4:00-6:00	Th	203J	Miss Lien
ArtEd.189w	Application of Esthetic Theory to Public Education (3 cred.; sr., grad.)	4:00-5:00	WF	203J	Miss Raymond
ArtEd.284Ef,w,s	Reading and Research in Art Education (3 cred.; grad.)	5:00-6:00	F		Miss Lien and staff
ArtEd.290E, 291E, 292Ef,w,s	Special Problems in Art Education—Tutorials	Ar	Ar	Ar	Miss Raymond, Miss Lien, and others
ArtEd.295f,w,s*	Special Problems in Art Education	Ar	Ar	Ar	Miss Lien

### CURRICULUM AND INSTRUCTION

**Major advisers.**—Professors Boardman, Bossing, Brueckner, Johnson, Dora V. Smith, and Wesley; Associate Professors Bond and Cook.

All courses under *Curriculum and Instruction* carry a fee of \$1 per credit.

#### GENERAL COURSES

Ed.C.I.104f‡	Adult Education (2 cred.; jr., sr., grad.)	I-II	S	115UHS	Mr. Dickerman
Ed.C.I.105s‡	Visual Aids in Teaching (2 cred.; jr., sr., grad.)	III-IV	S	106Pt	Mr. Archer
Ed.C.I.107f-108w†‡	Radio in Education (4 cred.; jr., sr.; prereq. 9 cred. in ed.)	III-IV	S	115UHS	Mr. Tyler
Ed.C.I.145s‡	Remedial Reading (3 cred.; prereq. Ed.C.I. 143 or 144 or 159)	4:30-6:30	W	100Pt	Mr. Bond
Ed.C.I.171f,w,s‡	Curriculum Laboratory Practice—A course in the analysis and construction of units, courses of study, and curricula; class projects and individual projects according to needs, interests, level, and specialization (2 to 6 cred.; sr., grad.; prereq. 170 or consent of instructor)	Ar	Ar	Ar	Mr. Bossing, Mr. Cook
Ed.C.I.207f,w,s*‡	Problems in Radio Education (1 to 6 cred. ar.)	Ar	Ar	Ar	Mr. Tyler

\* This course may be taken for independent study under Plan B for the Master's degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.271f,w,s*†	Problems in Curriculum Construction (2 or 3 cred. a qtr. with a maximum of 6; prereq. completion of current enrolment in one of the following: Ed.C.I. 113, 119, 170 or consent of instructor)	Ar	Ar	Ar	Mr. Bossing, Mr. Cook, Mr. Archer
Ed.C.I.273f,w,s*†	Problems in Reading (2 to 6 cred.; prereq. previous training in reading such as Ed.C.I. 143 or 144 or equiv.)	Ar	Ar	Ar	Mr. Bond

### ELEMENTARY EDUCATION

Ed.C.I.63Tf†	Children's Literature (2 cred.; for teachers in service)	IX-X	M	206UHS	Miss Smith
Ed.C.I.119f†	Elementary School Curriculum (4 cred.; sr., grad.; prereq. Ed.C.I. 61C or equiv.)	IX-X	MW	115UHS	Mr. Cook
Ed.C.I.130s†	World View of Childhood and Nursery Education (2 cred.; sr., grad.; prereq. 9 cred. in ed. including Ed.T. 55 or equiv.)	I-II	S	202Pt	Miss Gutteridge
Ed.C.I.143f†	Teaching of Reading in the Elementary School (3 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A or 61A)	4:30-6:30	W	100Pt	Mr. Bond
Ed.C.I.144w†	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (3 cred.; sr., grad.; prereq. same as for 143)	4:30-6:30	W	100Pt	Mr. Bond
Ed.C.I.146w†	Current Developments in Language Expression in the Elementary School (2 cred.; jr., sr., grad.; prereq. Ed. 61A-B-C or equiv. Not open to students who have had Ed.C.I. 64)	IX-X	M	202UHS	Miss Smith
Ed.C.I.148w†	The Teaching of Primary Arithmetic (2 cred.; sr., grad.; prereq. Ed. 61A-B-C, or equiv. Not open to students who have had Ed.C.I. 62)	IX-X	T	210Bu	Mr. Brueckner
Ed.C.I.149f†	The Teaching of Intermediate Grade Arithmetic (2 cred.; sr., grad.; prereq. Ed. 61A-B-C or equiv.)	IX-X	T	210Bu	Mr. Brueckner
Ed.C.I.150f†	Supervision and Improvement of Instruction. (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.)	I-II and 1 hr. ar.	S	204bUHS	Mr. Brueckner
Ed.C.I.153s†	Supervision and Teaching of English in the Elementary Schools (2 cred.; sr., grad.; prereq. Ed. 61A-B-C or equiv.)	I-II	S	204aUHS	Mr. Archer
Ed.C.I.157f,w,s†	Practice in Supervision (3 cred. a qtr.; sr., grad.; prereq. consent of instructor)	Ar	Ar	Ar	Mr. Brueckner
Ed.C.I.160s†	Supervision of Elementary Subjects (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	IX-X and 1 hr. ar.	T	204bUHS	Mr. Brueckner, Miss Smith, Mr. Wesley, Mr. Bond
Ed.C.I.170Aw†	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the elementary school level (3 cred.; sr., grad.; prereq. 119 or consent of instructor)	IX-X and 1 hr. ar.	M	115UHS	Mr. Cook
Ed.C.I.173As†	Organizing Units of Instruction in the Elementary School (2 cred.; sr., grad.; prereq. 119 or consent of instructor)	IX-X	M	115UHS	Mr. Cook
Ed.C.I.190w†	Principles of Selection of Materials for Reading in the Elementary School (2 cred.; sr., grad.; prereq. 63 or 122 or equiv.)	III-IV	S	204aUHS	Miss Smith

\* This course may be taken for independent study under Plan B for the Master's degree.

† A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.226f-227w-228s‡	Seminar in Elementary School Problems	IX-X	Th	209Bu	Mr. Brueckner, Mr. Bond, Mr. Cook, Mr. Archer
Ed.C.I.255w*‡	Supervision and Teaching of Arithmetic (2 cred.; prereq. 62 or 148 or 149 or equiv.)	I-II	S	204aUHS	Mr. Brueckner
Ed.C.I.261f,w,s*‡	Special Problems in School Supervision (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	Fall III-IV Winter, spring Ar	S	220Bu	Mr. Brueckner
Ed.C.I.263s*‡	Research in Arithmetic Instruction (2 cred.; prereq. Ed.C.I. 156 or 148 or 149 or equiv.)	IX-X	M	204bUHS	Mr. Brueckner
Ed.C.I.264w*‡	Research in Educational Diagnosis (2 cred.; prereq. Ed.C.I. 151 or equiv.)	III-IV	S Ar		Mr. Brueckner, Mr. Bond

### SECONDARY EDUCATION

Ed.C.I.113f‡	High School Curriculum (4 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51A-B-C)	IX-X	MW	209Bu	Mr. Bossing
Ed.C.I.113w‡	High School Curriculum (3 cred.; see above)	I-II and 1 hr. ar.	S	210Bu	Mr. Bossing
Ed.C.I.122s‡	Literature for Adolescents (2 cred.; jr., sr., grad.; prereq. Ed. 51C or junior-senior teaching experience)	I-II	S	117UHS	Miss Smith
Ed.C.I.135w‡	Teaching of Occupations and Group Guidance (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	106Pt	Miss Edwards, Miss Wright
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A)	4:30-6:30	W	100Pt	Mr. Bond
Ed.C.I.168f‡	Current Developments in the Social Studies (2 cred.; grad. only)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.170Bw‡	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the secondary school level. (3 cred.; sr., grad.; prereq. 113 or consent of instructor)	IX-X and 1 hr. ar.	M	204aUHS	Mr. Bossing
Ed.C.I.173Bs‡	Organizing Units of Instruction in the Secondary School (2 cred.; sr., grad.; prereq. 113 or consent of instructor)	IX-X	M	204aUHS	Mr. Bossing
Ed.C.I.191s‡	Advanced Course in the Teaching and Supervision of Secondary School Mathematics (2 cred.; prereq. Ed. 51C or permission of instructor)	I-II	S	115UHS	Mr. Walker
Ed.C.I.198s‡	Recent Literature in Methods and Curriculum in English (2 cred.; sr., grad.; prereq. Ed.T. 66A-B-C or equiv.) (Students should not register for this course in the same year with Ed.C.I. 294)	IX-X	M	206UHS	Miss Smith
Ed.C.I.201f-202w-203s*‡	Problems in Teaching the Social Studies (3 cred. a qtr.; grad.; prereq. consent of instructor)	4:00	T	226Bu	Mr. Wesley
Ed.C.I.204s‡	Social Studies Curriculum (2 cred.)	III-IV	S	206UHS	Mr. Wesley

\* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.222f-223w-224s†	Seminar—Current Problems in Technique of High School Instruction (With or without credit; prereq. Ed. 51C and Ed.C.I. 113)	IX-X	Th	204bUHS	Mr. Bossing, Mr. Johnson, Miss Smith, Mr. Wesley
Ed.C.I.225f,w,s*‡	Special Problems in Supervision of Instruction in Secondary Schools (Cred. ar.)	Ar	Ar	218Bu	Mr. Boardman
Ed.C.I.266s‡	Supervision of High School Instruction (3 cred. This course is part of a three-quarter sequence. For fall and winter courses see Ed.Ad. 264-265. Students may register for any quarter.)	III-IV 1 hr. ar.	S	204bUHS	Mr. Boardman
Ed.C.I.287f‡	Advanced Course in the Teaching of Science (2 cred.; sr., grad.; prereq. Ed. 51C)	IX-X	T	202UHS	Mr. Johnson
Ed.C.I.293s*‡	Foundations of Secondary School Methods (3 cred.)	IX-X and 1 hr. ar.	T	202UHS	Mr. Johnson
Ed.C.I.294f*‡	Advanced Course in Methods of Teaching English (2 cred.; prereq. Ed.T. 66A-B-C or equiv.)	III-IV	S	204aUHS	Miss Smith
Ed.C.I.296w-297s*‡	Special Problems in Techniques of Secondary School Instruction (Cred. ar.; grad.)	Ar	Ar	206Bu	Miss Smith

#### HIGHER EDUCATION

Ed.C.I.228f-229w-230s*‡	Problems of College Education (6 cred.)	Ar	Ar	Ar	Mr. McConnell, Miss Eckert
Ed.C.I.250f‡	Higher Education in the United States—Curriculum and Instruction (3 cred.; prereq. 15 hrs. in ed.)	I-II 1 hr. ar.	S	206UHS	Miss Eckert
Ed.C.I.285f‡	Professional Education of Teachers (2 cred.; prereq. 15 hrs. in ed.)	III-IV	S	328Lib	Mr. Peik
Ed.C.I.286f,w,s*‡	Problems in Teacher Training (2 cred. a qtr.; prereq. 285 or permission of instructor)	Ar(f,s) III-IV(w)	Ar	Ar	Mr. Peik Mr. Peik
	(See also Ed.Ad. 287s. Instruction and Administration in Teacher Training Institutions.)				

#### EDUCATIONAL ADMINISTRATION

**Major advisers.**—Professors Neale, Boardman, and Bossing.

##### GENERAL COURSES

Ed.Ad.124f	Public School Administration (3 cred.; sr., grad.; prereq. 10 hrs. in ed.)	IX	MWF	210Bu	Mr. Neale
Ed.Ad.125w	Techniques in Administration (3 cred.; sr., grad.; prereq. 124)	IX-X 1 hr. ar.	M	210Bu	Mr. Neale
Ed.Ad.210s*	Financial Aspects of Public School Business Administration (3 cred.; prereq. 124, 125)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.Ad.226s	School Plant Planning and Management (3 cred.; sr., grad.; prereq. 124, 125)	IX-X 1 hr. ar.	M	210Bu	Mr. Neale
Ed.Ad.228f,w,s*	Special Problems in Educational Administration (1 or 3 cred.; prereq. 124, 125)	Ar	Ar	224Bu	Mr. Neale

\* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Ad.230f*	Public Relations for Schools (3 cred.; grad.)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.Ad.235f-236w-237s	Seminar in Educational Administration	Ar	Ar	224Bu	Mr. Neale

#### ELEMENTARY EDUCATION

Ed.Ad.115w	Organization of the Elementary School (3 cred.; jr., sr., grad.; prereq. 10 hrs. in ed.)	III-IV 1 hr. ar.	S	111UHS	Mr. Neale
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#### SECONDARY EDUCATION

Ed.Ad.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	106Pt	Miss Edwards, Miss Wright
Ed.Ad.167f	Junior High School (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51)	I-II 1 hr. ar.	S	100Pt	Mr. Bossing
Ed.Ad.218f- 219w-220s	Recent Literature in Secondary Education (Cred. ar.)	IX-X	Th	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.264f-265w	High School Administration (3 cred. a qtr.; grad. For third quarter continuation of this course see Ed.C.I. 266. Students may register for any quarter.)	III-IV 1 hr. ar.	S	204bUHS	Mr. Boardman
Ed.Ad.270f,w,s*	Special Problems in Secondary Education (Cred. ar.; maximum 9 cred.)	Ar	Ar	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.280f,w,s‡	Practice in High School Administration (2 cred. a qtr.; sr., grad.; prereq. 264-265 or equiv. and consent of instructor)	Ar	Ar	218Bu	Mr. Boardman

#### HIGHER EDUCATION

Ed.Ad.287s	Instruction and Administration in Teacher Training Institutions (2 cred.; prereq. 15 hrs. in ed.)	I-II	S	328Lib	Mr. Peik
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#### EDUCATIONAL PSYCHOLOGY

**Major advisers.**—Professors Miller, Johnson, McConnell, and Wrenn; Associate Professors Bond, Cook, and Van Wagenen.

#### GENERAL COURSES

Ed.Psy.60f	Introduction to Statistical Methods (2 cred.; jr., sr.; prereq. 6 cred. in psy.)	I-II	S	106Pt	Mr. Fattu
Ed.Psy.116w-117s	Statistical Methods in Education (4 cred.; sr., grad.)	IX-X	T	115Psy	Mr. Van Wagenen
Ed.Psy.120s	Basic Principles of Measurement (3 cred. See 120f)	I-II 1 hr. ar.	S	204bUHS	Mr. Cook
Ed.Psy.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	106Pt	Miss Edwards, Miss Wright
Ed.Psy.142f	Individual Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	4:30-5:45	TTh	211Bu	Mr. Bond
Ed.Psy.159s	Personality Adjustments in Education (2 cred.; see above)	4:00-5:30	T	115Psy	Mr. Wrenn

\* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.201f-202w-203s	Seminar in Educational Psychology	Ar	Ar	301Psy	Mr. Miller, Miss Ed-wards, Mr. Johnson, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.208w	Methods in Educational Research (2 cred.)	IX-X	M	206UHS	Mr. Johnson
Ed.Psy.233f,w,s	Problems in Guidance and Personnel Work (Cred. ar. consent of instructor)	Ar(f,w)	Ar	Ar	Mr. Wrenn, Miss Ed-wards
Ed.Psy.204f,w,s*	Problems in Measurement (2 cred. a qtr.)	VIII-IX(s) Ar	W	213Psy	Mr. Wrenn
Ed.Psy.243f,w,s	Problems in Statistics for Students in Education and Psychology (With or without credit. Cred. ar.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.253f,w,s*	Research Problems (Ar.; prereq. consult instructor)	Ar	Ar	Ar	Mr. Johnson
	Ed. Psy. 240)	Ar	Ar	Ar	(See also Ed.Psy. 233 and Ed. Psy. 240)
Ed.Psy.281f,w,s	Practice in Personnel Work (Cred. ar. Maximum 9 cred. or to be taken concurrently; prereq. consent of instructor)	Ar	Ar	Ar	Mr. Miller, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
		Ar	Ar	Ar	Ed.Psy 225 prereq.
					Mr. Wrenn, Miss Ed-wards, Mr. Darley

#### ELEMENTARY EDUCATION

Ed.Psy.113f-114w-115s	Psychology of Elementary School Subjects (2 cred. per qtr.; jr., sr., grad.; prereq. 10 cred. in psy. and ed.)	IX-X	W	109Psy	Mr. Van Wagenen
Ed.Psy.146w-147s†	Child Guidance (4 cred.; jr., sr., grad.; prereq. 15 cred. in psy. and ed.)	I-II	S	100Pt	Ar
Ed.Psy.157	<i>Psychology of Child Development</i> (2 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) (Not offered) (See Child Welfare 130-131)				
Ed.Psy.182	<i>Education of Handicapped Children</i> (2 cred.; jr., sr., grad.; prereq. Ed. 51A or 61A or equiv.) (Not offered)				
Ed.Psy.183w	Education of Gifted Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	I-II	S	106Pt	Mr. Bond
Ed.Psy.184s	Education of the Slow Learning Child (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	I-II	S	106Pt	Mr. Bond

#### HIGHER EDUCATION

Ed.Psy.254s	Measurement and Evaluation in Higher Education (3 cred.; 15 hrs. in ed.)	I-II	S	114UHS	Mr. Johnson
		1 hr. ar.			

\* This course may be taken for independent study under Plan B for the Master's degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.



## HISTORY AND PHILOSOPHY OF EDUCATION

**Major advisers.**—Professor Wesley; Associate Professor Brameld; Assistant Professor Jean H. Alexander.

### GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71)	IX-X 1 hr. ar.	W	210Bu	Miss Alexander
H.Ed.162s	Significance of Progressive Education (2 cred.; sr., grad.)	III-IV	S	115UHS	Mr. Brueckner, Mr. Brameld
H.Ed.176f	Conflicting Issues in Modern Education (2 cred.; jr., sr., grad.; not open to students who have taken 76; prereq. 6 hrs. in psy.)	IX-X	M	204aUHS	Mr. Brameld
H.Ed.180w	The School and the Social Order (2 cred.; jr., sr., grad.; prereq. 12 cred. in soc. sci.)	IX-X	M	204bUHS	Mr. Brameld
H.Ed.241f- 242w-243s*	Problems in the History of Education (2 cred. a qtr.; prereq. permission of instructor)	IX-X	M	226Bu	Mr. Wesley
H.Ed.276f,w,s*	Problems in Educational Philosophy and Sociology (Cred. ar.; consult instructor)	Ar	Ar	Ar	Mr. Brameld

### ELEMENTARY EDUCATION

H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71)	IX-X 1 hr. ar.	W	210Bu	Miss Alexander
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### HOME ECONOMICS EDUCATION

**Major advisers.**—Professors Wylle B. McNeal and Clara M. Brown; Assistant Professor Ella J. Rose.

H.E.Ed.193f,w,s	Home Economics Curriculum (2 or 3 cred.; sr., grad.; prereq. or parallel H.E.Ed. 94 or permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.197f,w,s‡	Organization and Methods for Related Art Teaching (1 to 3 cred.; sr.; prereq. H.E.Ed. 91; H.E. 180 or parallel)	Ar	Ar	Ar	Miss H. Gold- stein
H.E.Ed.243f,w,s	Trends in Home Economics (3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose
H.E.Ed.292s*	Educational Measurement Problems (3 cred.; prereq. H.E.Ed. 192)	Ar	Ar	Ar	Miss Clara Brown
H.E.Ed.293f,w,s*	Special Studies in Home Economics Education (1 to 3 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose

\* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of \$1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.294w,s*	Research Problems (1 to 5 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.295f,w,s*	Current Problems (1 to 3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose

## INDUSTRIAL EDUCATION

**Major advisers.**—Professor Homer J. Smith; Associate Professor Fryklund.

Ind.11f,w,s‡¶	Special-Class Woodwork (2 cred.; no prereq.; not open to those who have credit in bench woodwork or cabinet making; for teachers of art, subnormal and elementary grade work) (Limited to 24)	I-IV	S	6Pt	Ar
Ind.40f,s	Analysis (2 cred.; no prereq.)	IX-X	T(f)	209EdH	Mr. Fryklund
Ind.42w	Course Organization (2 cred.; prereq. Ind. 40)	IX-X	T	209EdH	Mr. Fryklund
Ind.44s	Equipment and Management (2 cred.; prereq. Ind. 40, 42)	IX-X	T	202EdH	Mr. Fryklund
Ind.60f	Philosophy of Vocational Education (2 cred.; no prereq.)	IX-X	M	202EdH	Mr. Widdowson
Ind.61w	Practices in Vocational Education (2 cred.; prereq. Ind. 60)	IX-X	M	202EdH	Mr. Widdowson
Ind.65¶	<i>Non-Vocational Subjects (Not offered)</i>				
Ind.66f	Related Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	Mr. Smith
Ind.70f‡	Methods in Shop Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	Th	202EdH	Mr. Fryklund
Ind.75f‡	Methods in Drawing (2 cred.; prereq. 10 cred. in drawing or consent of instructor. Not a course in drawing)	IX-X	W	202EdH	Mr. Fryklund
Ind.80w	General Industrial Training (2 cred.; no prereq. Not a shop course)	IX-X	Th	202EdH	Mr. Micheels
Ind.101w	Tests in Industrial Subjects (2 cred.; prereq. Ed. 51A)	IX-X	F	202EdH	Mr. Fryklund
Ind.102s¶	The General Shop (2 cred.; jr., sr.; prereq. Ind. 80. Not a shop course)	IX-X	Th	202EdH	Mr. Micheels
Ind.103s¶	Instructional Aids (2 cred.; sr., grad.; prereq. Ind. 40, 42)	IX-X	F	202EdH	Mr. Fryklund
Ind.105s¶	Industrial Education (3 cred.; jr., sr., grad.)	IX-X and 1 hr. ar	W	202EdH	Mr. Smith
Ind.107f¶	Co-ordination (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61 or 105 or consent of instructor)	IX-X	T	202EdH	Mr. Widdowson
Ind.108w¶	Apprenticeship (2 cred.; jr., sr., grad.; prereq. same as for 107)	IX-X	T	202EdH	Mr. Widdowson
Ind.115w¶	Supervision of Industrial Education (3 cred.; sr., grad.; prereq. Ind. 60, 80, Ed.Ad. 124 or consent of instructor)	IX-X and 1 hr. ar	W	202EdH	Mr. Fryklund
Ind.170s¶	Day Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61)	IX-X	M	202EdH	Mr. Widdowson
Ind.171s¶	Evening Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 170)	IX-X	T	209EdH	Mr. Widdowson
Ind.172w¶	Part-time Education (2 cred.; jr., sr., grad.; prereq. Ind. 170, 171)	IX-X	Th	209EdH	Mr. Fryklund

\* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of \$1 per credit is charged for this course.

¶ Not a part of the four-year curriculum.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.200f,w*¶	Research Problems (3, 6, or 9 cred.; approved graduates only)	III-IV	S	200EdH	Mr. Smith, Mr. Fryklund
Ind.250f-251w-252s¶	Problems in Vocational Education (6 cred.; approved graduates only. Plan for full year)	I-II	S Ar		Mr. Smith

Off-Campus Courses and Services—Mr. Widdowson and Mr. Fryklund.

Shop and Drawing Courses—arranged by Mr. Smith.

Shop and drawing courses are available in wide variety in the Institute of Technology, University campus, and the Division of Agricultural Engineering, Farm campus. Students may elect to pursue courses, day or evening, at the William Hood Dunwoody Industrial Institute without fees other than those paid to the University, except a deposit of \$1. Degree candidates, especially those transferring from other institutions, should bear in mind the maximum of 45 credits in shop work and drawing combined, which is enforced in this department. Credits in excess of 45 will be recorded but will not be counted toward degree requirements. Graduate students may have credit recorded but it will not be counted toward their degree.

*Graduate programs.*—The departmental office will provide mimeographed materials descriptive of admission requirements and program patterns for both the M.A. and M.Ed. degrees, plans A, B, X, and Y. Letters of inquiry concerning Ph.D. programs will be appreciated.

## METHODS AND DIRECTED TEACHING

Major adviser.—Assistant Professor Anderson.

### ELEMENTARY EDUCATION

Ed.T.77Af-77Bw- 77Cst†‡§	Directed Teaching in Kindergarten or Nursery School and Primary Grades (9 cred.; sr.; prereq. Ed.T. 55 to 59 and 76A-B-C)	IX	M	100Pt	Miss Gutteridge and 9 hrs. ar.
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### SECONDARY EDUCATION

Ed.T.61s†§	Teachers' Course in Norwegian (3 cred.; sr.; prereq. Scand. 4-5-6)	Ar	Ar	122F	
Ed.T.62f,w,†§	Teachers' Course in Swedish (3 cred.; sr.; prereq. Scand. 10-11-12)	VII	MWF	122F	
Ed.T.68Af-68Bw- 68Cst†‡§	Special Methods Course and Directed Teaching in Secondary School Science (9 cred.; sr.; prereq. consent of instructor)	IX	MW	215UHS	Mr. Johnson, Mr. Peterson
Ed.T.68Amf- 68Bmw†‡§	Methods of Teaching Secondary School Science (4 cred.; sr.; prereq. consent of instructor)	IX	MW	6aPt	Mr. Johnson, Mr. Peterson
Ed.T.70Af-70Bw- 70Cst†‡§	Special Methods and Directed Teaching in German (9 cred.; sr.; prereq. German Comp. 50-51-52, German Conversation 53-54-55 and 15 additional credits)	IX	MW	114UHS	Ar
Ed.T.71Af-71Bw- 71Cst†‡§	Special Methods and Directed Teaching in Latin (9 cred.; jr., sr.; prereq. 73 and any two of Latin courses numbered between 50 and 100)	IX	MW	112UHS	Miss Marlowe and 6 hr. ar.
Ed.T.72Af-72Bw- 72Cst†‡§	Special Methods and Directed Teaching in Romance Languages (9 cred.; sr.; prereq. 20 cred. above French 4. Consult instructor)	IX	TTh	206UHS	Miss Walker and 6 hr. ar.

\* This course may be taken for independent study under Plan B for the M.A. degree or under Plan Y for the M.Ed. degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per credit is charged for this course.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

¶ Not a part of the four-year curriculum.

## MUSIC EDUCATION

**Major advisers.**—Professors Scott and Pepinsky; Instructor Hazel B. Nohavec.

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.60f-61w 62s†‡§	Supervision and Teaching (9 cred.; sr.; prereq. Ed. 51A,B,C and Mu.Ed. 50A,B, 53 and a C+ average in the major)	IX-X and 6 hr. ar.	W	4Mu	Mrs. Nohavec
Mu.Ed.220Ef,w,s	Survey and Application of Research in Music Education (3 cred.; prereq. Mu.Ed. 101)	Ar	Ar	Ar	Mrs. Nohavec
Mu.Ed.224Ef,w,s	Seminar and Individual Research Problems in Music Education (Cred. ar.)	Ar	Ar	Ar	Mrs. Nohavec and others
Mu.Ed.225Ef,w,s††	Advanced Applied Music (2 to 4 cred.; prereq. entrance exam.)	Ar	Ar	Ar	Ar

### ADDITIONAL COURSES IN ACADEMIC SUBJECTS

There are also some late afternoon and Saturday morning academic courses offered in the respective teaching fields. Persons who desire to take work in any such department can get the necessary information by securing from the recorder's office the bulletin entitled Combined Class Schedule for 1941-42. Its price is 35 cents.

### MAJOR ADVISERS\*

1941-42

Subject	Name of Instructor	Room
General Curriculum Adviser.....	Jean H. Alexander, Chairman Students' Work Committee.....	206Bu

### EDUCATIONAL FIELDS

Adult Education .....	Watson Dickerman .....	409Adm
Agricultural Education .....	G. F. Ekstrom .....	205Hort (UF)
	A. M. Field.....	205Hort (UF)
Art Education .....	Ruth Raymond .....	209J
	Marie Lien.....	209J
Curriculum and Instruction .....	W. E. Peik (Teacher Training).....	204Bu
	T. R. McConnell (Higher).....	214Bu
	C. P. Archer (Elementary).....	208Bu
	N. L. Bossing (Secondary).....	222Bu
	G. L. Bond (Elementary).....	212Bu
	L. J. Brueckner (Elementary).....	220Bu
	W. W. Cook (Elementary).....	305EdH
Educational Administration .....	C. W. Boardman (Secondary).....	218Bu
	N. L. Bossing (Secondary).....	222Bu
	M. G. Neale (General).....	224Bu
Educational Psychology .....	W. W. Cook.....	305AEdH
	P. O. Johnson.....	216Bu
	T. R. McConnell.....	217Adm
	W. S. Miller.....	302Psy
	M. J. Van Wagenen.....	351Psy
	C. G. Wrenn.....	113APsy
	Marcia Edwards.....	202Bu

\* For Graduate School advisers see Bulletin of the Graduate School.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per credit is charged for this course.

‡‡ One individual lesson per week, 2 credits, \$25; two individual lessons per week, 4 credits, \$50.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

Subject	Name of Instructor	Room
Elementary Education	C. P. Archer	208Bu
	G. L. Bond	212Bu
	L. J. Brueckner	220Bu
	W. W. Cook	305EdH
History of Education	Jean H. Alexander	206Bu
	Edgar B. Wesley	226Bu
Home Economics Education	Clara M. Brown	101HE(UF)
	W. B. McNeal	215HE(UF)
	Ella J. Rose	111HE(UF)
Industrial Education	H. J. Smith	200EdH
	Verne Fryklund	200EdH
Library Training	F. K. Walter	107Lib
Methods and Directed Teaching	L. J. Brueckner	220Bu
	G. Lester Anderson	103UHS
	Dora V. Smith	206Bu
Music Education	Hazel B. Nohavec	213Mu
	A. Pepinsky	207Mu
Nursery School and Kindergarten Education	J. E. Anderson	205APt
Nursing Education	Katharine J. Densford	123MeS
	Lucile Petry	125MeS
Philosophy of Education	Theodore Brameld	216ABu
Physical Education for Men	L. F. Keller	204CH
	C. L. Nordly	217CH
Physical Education for Women	Gertrude M. Baker	102WGYm
Professional Education of Teachers	W. E. Peik	204Bu
Public Health Nursing	Ruth Freeman	121MH
Radio Education	T. F. Tyler	231NMA
Recreational Leadership	E. L. Haislet	207CH
	C. L. Nordly	217CH
School Health Work	G. W. Anderson	121MH
Student Teaching	G. Lester Anderson	103UHS
Teachers of Subnormal Children	G. L. Bond	212Bu

#### SUBJECT-MATTER FIELDS

Anthropology	W. D. Wallis	106WeH
Astronomy	W. J. Luyten	359Ph
Botany	F. K. Butters	302Bo
Chemistry	P. O. Johnson	216Bu
Economics	E. A. Heilman	313VH
English	C. W. Nichols	319F
	Dora V. Smith	206Bu
Geography	D. H. Davis	101Bu
German	O. C. Burkhard	210F
History	A. C. Krey	226Bu
	Edgar B. Wesley	226Bu
Latin	R. V. Cram	118F
Mathematics	A. L. Underhill	126F
Natural Science	P. O. Johnson	216Bu
Physics	J. W. Buchta	148Ph
Political Science	E. M. Kirkpatrick	213Bu
Preventive Medicine and Public Health	G. W. Anderson	121MH
Psychology	William T. Heron	253Psy
Romance Languages	F. B. Barton	228F
Scandinavian	Alrik Gustafson	122F
Social Studies	Edgar B. Wesley	226Bu
Sociology and Social Work	C. Kirkpatrick	111J
Speech	F. M. Rarig	309AF
Speech Pathology	B. Bryngelson	410F
Zoology	J. E. Wodsedalek	9Z

## COMPLETE SUMMARY OF CLASS SCHEDULES

Saturday I-II	Saturday III-IV	Monday IX-X	Tuesday IX-X	Wednesday IX-X	Thursday IX-X	Friday IX-X
<b>FALL</b>						
ArtEd.23 ArtEd.61 (Sec. 3) ArtEd.66 ArtEd.124E Ed.C.I.104 Ed.C.I.150 Ed.C.I.250 Ed.Ad.230 Ed.Ad.167 Ed.Psy.60 Ind.11 Ind.250	ArtEd.52A* ArtEd.81A ArtEd.61 (Sec. 3) ArtEd.66 ArtEd.124E Ed.C.I.107 Ed.C.I.261 Ed.C.I.168 Ed.C.I.294 Ed.C.I.285 Ed.Ad.133 (also Ed.Psy.133) Ed.Ad.264 Ind.11 Ind.200	ArtEd.154 (optional) Ed.C.I.63T Ed.C.I.119 Ed.C.I.113 Ed.Ad.124† H.Ed.176 H.Ed.241 Ind.60 Ed.T.77A† Ed.T.68A† Ed.T.68Am† Ed.T.70A† Ed.T.71A†	Ed.C.I.149 Ed.C.I.201 (4:00) Ed.C.I.287 Ed.Psy.142 Ind.40 Ind.107 Ed.T.72A†	ArtEd.154 (4:00-5:00) Ed.C.I.119 Ed.C.I.143 Ed.C.I.113 Ed.Ad.124† Ed.Psy.113 Ind.75 Ed.T.68A† Ed.T.68Am† Ed.T.70A† Ed.T.71A† Mu.Ed.60	Ed.C.I.226 Ed.C.I.222 Ed.Ad.218 Ed.Psy.142 Ind.70 Ed.T.72A†	ArtEd.154 (4:00-5:00) ArtEd.284E (5:00-6:00) Ed.Ad.124† Ind.66
<b>WINTER</b>						
ArtEd.23 ArtEd.62 ArtEd.67 ArtEd.125E Ed.C.I.255 Ed.C.I.113 Ed.Psy.146 Ed.Psy.183 Ind.11 Ind.251	ArtEd.150E† ArtEd.81B ArtEd.62 ArtEd.67 ArtEd.125E Ed.C.I.108 Ed.C.I.190 Ed.C.I.264 Ed.C.I.135 Ed.C.I.286 Ed.Ad.115 Ed.Ad.265 Ind.11 Ind.200	ArtEd.189 (4:00-5:00—optional) Ed.C.I.146 Ed.C.I.170A Ed.C.I.170B Ed.Ad.125 Ed.Psy.208 H.Ed.180 H.Ed.242 Ind.61 Ed.T.77B Ed.T.68B† Ed.T.68Bm† Ed.T.70B† Ed.T.71B†	Ed.C.I.148 Ed.C.I.202 (4:00) Ed.Psy.116 Ind.42 Ind.108 Ed.T.72B†	ArtEd.189 (4:00-5:00) Ed.C.I.144 Ed.Psy.114 Ind.115 Ed.T.68B† Ed.T.68Bm† Ed.T.70B† Ed.T.71B† Mu.Ed.61	ArtEd.153 (4:00-6:00) Ed.C.I.227 Ed.C.I.223 Ed.Ad.219 Ind.80 Ind.172 Ed.T.72B†	ArtEd.189 (4:00-5:00) ArtEd.284E (5:00-6:00) Ind.101
<b>SPRING</b>						
ArtEd.63 ArtEd.68 ArtEd.126E Ed.C.I.130 Ed.C.I.153 Ed.C.I.122 Ed.C.I.191 Ed.Ad.210 Ed.Ad.287 Ed.Psy.120 Ed.Psy.147 Ed.Psy.184 Ed.Psy.254 Ind.11 Ind.252	ArtEd.151E† ArtEd.63 ArtEd.68 ArtEd.126E Ed.C.I.105 Ed.C.I.204 Ed.C.I.266 H.Ed.162 Ind.11 Ind.200	ArtEd.183E (4:00-5:00) Ed.C.I.173A Ed.C.I.263 Ed.C.I.173B Ed.C.I.198 Ed.Ad.226 H.Ed.243 Ind.170 Ind.11 Ed.T.77C Ed.T.68C Ed.T.70C Ed.T.71C†	ArtEd.155E (4:00-6:00) Ed.C.I.160 Ed.C.I.203 (4:00) Ed.C.I.293 Ed.Psy.117 Ed.Psy.159 (4:00-5:30) Ind.44 Ind.171 Ed.T.72C†	ArtEd.183E (4:00-5:00) Ed.C.I.145 Ed.Psy.115 H.Ed.103 Ed.Psy.117 Ind.105 Ed.T.68C Ed.T.70C Ed.T.71C Mu.Ed.62	ArtEd.185 (4:00-6:00) Ed.C.I.228 Ed.C.I.224 Ed.Ad.220 Ind.102 Ed.T.72C†	ArtEd.183E (4:00-5:00) ArtEd.284E (5:00-6:00) Ind.103

\* Meets III hour only.

† Meets IX hour only.

*The Bulletin of the*  
UNIVERSITY of MINNESOTA

Division of Library Instruction  
Announcement for the Year 1941-1942

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Volume XLIV, Number 60

September 24, 1941

*Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota.  
Accepted for mailing at special rate of postage provided for in Section 1103, Act of  
October 3, 1917, authorized July 12, 1918*

## OFFICERS AND FACULTY

- Walter C. Coffey, M.S., LL.D., Acting President
- Frank K. Walter, M.A., M.L.S., University Librarian, Director of the Division of Library Instruction, and Professor of Library Methods
- True E. Pettengill, M.S., Recorder, and Acting Director of Admissions
- Lura C. Hutchinson, B.A., Associate Professor of Cataloging, Classification, Reference, and Selection of Books
- Harold Russell, B.A., B.L.S., Reference Librarian, University of Minnesota Library, Assistant Professor of Library Methods and Bibliography
- Margaret R. Greer, B.A., B.S., Director of School Libraries, Minneapolis Board of Education, Instructor in School Library Administration
- Perrie Jones, B.A., Librarian, St. Paul Public Library, Instructor in Hospital Librarianship
- Della McGregor, B.A., Chief, Juvenile Department, St. Paul Public Library, Instructor in Library Work with Children
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- Raymond H. Shove, B.S. in L.S., M.A., Head of Order and Binding Department, University of Minnesota Library, Instructor in Library Methods and Bibliography
- Carl Vitz, B.A., B.L.S., Librarian, Minneapolis Public Library, Instructor in Public Library Administration
- Isabelle T. Anderson, B.A., B.S. in L.S., Librarian, Ramsey County Medical Society, Lecturer on Medical Reference
- Joyce Davenport, M.A., B.S., Reference Assistant, University of Minnesota Library, Lecturer on Library Methods
- Helen H. Norris, B.A., Librarian, Hennepin County Medical Society, Lecturer on Medical Reference
- Blanche Moen, B.A., Reference Assistant, University of Minnesota Library, Lecturer on Library Methods
- Marguerite E. Ogden, B.S., Assistant, University of Minnesota Library, Lecturer on Library Methods



## GENERAL INFORMATION

The Division of Library Instruction of the University of Minnesota was established by the regents of the University in April, 1928, as an instructional unit. It does not admit students or confer degrees. Students who wish to elect its courses must be registered in some one of the colleges of the University. The purpose of the division is to unite the facilities of the University for training for professional service in libraries of varied types. It prepares and conducts for the various instructional units of the University interested in such training, curricula or programs to be offered for credit by these units.

Credits for its courses are given by the schools or colleges approving them for inclusion in their curricula. Students who offer these courses as a partial requirement for a degree must comply in every particular with the specific requirements of the school or college from which the degree is desired. These requirements are described in the regular announcements of the various schools and colleges of the University, which are obtainable on application to the recorder of the University.

The professional courses in library instruction are for Senior College students or graduates. At least two full years of approved college work are required as prerequisite for regular admission to any of these courses, and at least three years of approved preliminary college work, in addition to a full year in library instruction, are required for a degree. The College of Science, Literature, and the Arts and the University College accept only library training students with senior standing. The College of Education will credit a minor of library training during the junior year, but requires a full four-year program for a degree. (See pages 8-10.) School of Business Administration students desiring library instruction credits must have senior standing. Students in the College of Agriculture, Forestry, and Home Economics may also receive credit by special arrangement. Persons not eligible for regular registration may be admitted as unclassified students only by complying with such college regulations or by passing such tests as may be required.

Library instruction implies a good educational background. Students in full senior standing are eligible for admission, but all who are able to complete a full four-year college course *before* admission to this division are urged to do so. Many in each class have at least a Bachelor's degree before entering this division. Admission to the second (or graduate) year of library schools offering advanced work in this field is usually conditioned on at least five years' preparation (four full years of college work and a year of library training). Most of the more responsible library positions have the same requirements, and graduates of the division without this five-year preparation are becoming increasingly handicapped in obtaining suitable employment.

Experience in a good library enables students to gain a knowledge of library organization and terminology which is of real advantage especially in the first quarter of the course. Inexperienced students who have an opportunity to obtain such experience in a *well-organized library* should plan to do so for at least a month, through voluntary service or otherwise. The Division of Library Instruction has no adequate facilities for providing this preliminary experience.

Library work involves making records of various kinds. Legible handwriting

is important. Both legibility and speed are needed in making records and all prospective students should have some facility in the use of the typewriter. Since there is little time or opportunity to acquire it during the course, this ability to type should be acquired in advance. Inability to use a typewriter, at least reasonably well, often proves a disadvantage in applying for a library position. Since it is not possible to provide free typewriter service for all students it is very advantageous for students to have typewriters of their own or to rent them for personal use from the several agencies near the campus.

**Employment.**—The number of persons trained for library work somewhat exceeds the number of suitable positions available. Consequently, library boards are generally demanding broader education, acceptable personality, and more professional training and experience on the part of candidates for library positions. Prospective students of low, mediocre, or inadequate scholastic standing, unsuitable personality, impaired health, or marked physical disability are not advised to register in this division. There are very few positions for such persons or for those who have failed in other vocations, those unable or unwilling to obtain adequate training, or those over thirty-five years of age.

Every effort is made by the division and the other appropriate placement agencies of the University to assist students to obtain positions, but no promise of employment can be made, and the division cannot hold itself responsible for failure to secure employment. Those who are unwilling to assume the necessary personal responsibility are not advised to undertake the work offered by this division. The Bureau of Recommendations of the College of Education reports a good chance in school library work for candidates with suitable educational preparation and personality. Local and general economic conditions determine the number and kind of positions available at any given time. These may vary from year to year, and the division is powerless to control either the conditions or the positions. Even when positions are available, all that can be done for the student is to introduce him, as favorably as truth will permit, to prospective employers. His personal and professional qualifications must eventually determine his securing and holding the position.

**Nonresident students.**—Preference in admission is given to suitably prepared residents of Minnesota. The University has established a quota for out-of-state students. Nonresidents of Minnesota are therefore advised to apply and present their credentials as early as practicable to increase their chances of admission.

**Registration.**—All students, whether full-time, part-time, or auditors must be regularly registered. Full information concerning registration is given in the Bulletin of General Information, which may be obtained on application to the recorder of the University.

Lib. Meth. 1 is not a part of the professional curriculum of the Division of Library Instruction. Lib. Meth. 51 to 126 are professional courses open only to senior students or graduates (except those taking them as a major or a minor in the College of Education). The completion of a full year in library methods is accepted for graduation as the equivalent of the senior year in the College of Science, Literature, and the Arts, the College of Education, and the University College. Senior students from other colleges may be admitted and receive credit on approval by the dean of the college concerned and the director of the Division of Library Instruction.

The division is accredited as a Class III school (one requiring less than four years of college work for admission) by the American Library Association. It is also a member of the Association of American Library Schools.

## COURSES OF STUDY

Two programs, one of one year in the College of Science, Literature, and the Arts, and the other in the College of Education, leading to the degree of bachelor of science are offered. Each requires for its completion four full years of work, including a full year of professional training (45 quarter credits) in library methods, in the college in which the student is registered. All regulations of the college from which the degree is desired must be complied with before the degree will be granted. Credit for certain courses in library instruction will also be given in the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. Permission for such credit must be obtained from the deans of these colleges. Special programs involving a full year of library work and eligibility for a degree may be arranged with the director of the University College. Since the course is a full year's sequence it is not advisable to begin it at any time other than at the beginning of the fall quarter. A special course in Hospital Librarianship is offered in the spring quarter. See pages 10-11 for the special requirements for admission.

Credits from other approved library training schools of equivalent grade may be accepted as prerequisite to advanced courses in the same fields but cannot be used to shorten the year of resident work required in the Division of Library Instruction. Resident credit will be given for the satisfactory completion of Summer Session courses offered by the University under the general direction of the division. Up to the present, certain conditions which apply particularly to the school libraries of the state have made it impossible to offer these summer courses in the order of the regular schedule and thus shorten materially the time required in residence for a degree with a library training major.

**Correspondence study courses.**—A few correspondence study courses are offered by the General Extension Division. These courses are not conducted by the Division of Library Instruction and no credit is given for them in the regular course. They may be offered as prerequisites for advanced resident work in their specific subjects.

## DESCRIPTION OF COURSES

### COURSE NUMBERING

A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by the letter (f, fall; w, winter; s, spring; su, summer), e.g.:

1f-2w, a two-quarter course given in the fall and winter.

1w-2s, the same course given in the winter and spring.

3f,w,s, a one-quarter course given each quarter.

Senior College courses are numbered as follows: courses primarily for juniors and seniors, from 50 to 99; for juniors, seniors, and graduates, from 100 to 199; for graduates only, from 200 up. The hours of recitation are numbered by roman numerals, the day by the appropriate initial, the room by an arabic numeral, and

the building by an abbreviation. For example (MWF III; 5Lib.), means that the class meets Monday, Wednesday, and Friday, the third recitation hour, in Room 5, Library.

### FRESHMAN AND SOPHOMORE NONPROFESSIONAL COURSE

Lib.Meth. 1f,w,s. Use of Books and Libraries. Study of reference material for personal study and research. No credit toward a degree in library instruction, but general credit is given in the College of Science, Literature, and the Arts, and in such other schools and colleges as may, by special arrangement, desire their students to be registered in the course. (2 cred.; fr., soph. only except by special permission; no prereq.; Sec. 1, MW II, 3Lib., Mr. Russell, Miss Moen; Sec. 2, MW IV, 3Lib., Mr. Shove, Miss Ogden; Sec. 3, MW VI, 3Lib., Miss Davenport.)

### PROFESSIONAL COURSES\*

For the courses below, aggregating a full year of college work, credit is given only to students who have met all the requirements for admission to the Senior College courses in the colleges specified above, except as specified on pages 8-10. Courses 52, 54, 61, and 62 are required of all candidates for a degree.

Lib.Meth. 51f. Bibliography. Trade and national bibliography of the United States, Great Britain, and Europe; book ordering methods. (3 cred.; no prereq.; MWF III; 5Lib.) Mr. Shove.

Lib.Meth. 52f. Cataloging. Elements of dictionary cataloging. Lecture, problems, and practice. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; Sec. 1, MWF I, education students; Sec. 2, MWF IV; 5Lib.) Miss Hutchinson.

Lib.Meth. 53w. Advanced Cataloging. Continuation of Lib.Meth. 52, with special attention to difficult books and administrative aspects of a catalog department. (3 cred.; prereq. Lib.Meth. 52; MWF IV; 5Lib.) Miss Hutchinson.

Lib.Meth. 54f. Classification. Classification by the Dewey Decimal System, author numbers, shelf and accession records. Required of all candidates for a degree. (3 cred.; no prereq.; TThS II; 5Lib.) Miss Hutchinson.

Lib.Meth. 55w. Advanced Classification. Continuation of Lib.Meth. 54. Library of Congress and other classifications; classed catalogs; special adaptations of classification. (3 cred.; prereq. Lib.Meth. 54; TThS II; 5Lib.) Miss Hutchinson.

Lib.Meth. 57s. Secondary School Libraries. Administrative methods and problems, including methods of teaching the use of the library. (3 cred.; prereq. 9 cred. in library methods; W VIII, S I, IV; 5Lib.) Miss Greer.

Lib.Meth. 58s. Public Library Administration. Administration, equipment, finance, and extension work of public libraries. (3 cred.; prereq. 9 cred. in library methods; TThS II; 5Lib.) Mr. Vitz.

Lib.Meth. 60f. Library Binding. Economics of library binding. Materials, processes, records, book repair. (1 cred.; no prereq.; T III; 5Lib.) Mr. Walter.

Lib.Meth. 61f,w,s. Library Practice. Practice, under supervision, in Minneapolis and St. Paul libraries. The time and character of the practice will be individually arranged to suit student aptitudes, usually in the second and third quarters. Required of all candidates for a degree in library methods. See

\* See Fees and Expenses, page 11.

- pages 8-11 for College of Education regulations. (4½ cred. for College of Education students to meet requirements of the Minnesota State Education Department for school librarians; others, 3 cred.; prereq. 15 cred. in library methods or satisfactory library experience.) Mr. Walter, Miss Hutchinson.
- Lib.Meth. 62w. Reference. Reference books and other material with emphasis on methods of search and adaptation of material to needs of users. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; MWF III; 5Lib.) Miss Hutchinson.
- Lib.Meth. 63s. Advanced Reference. Continuation of Lib.Meth. 62. Specialized reference material, public documents, and periodicals. Reference lists and reports on special problems. (3 cred.; prereq. Lib.Meth. 62; MWF III; 5Lib.) Miss Hutchinson.
- Lib.Meth. 64s. Selection of Books for Adolescents. Principles of selection and criticism of representative books. Study and preparation of book lists for adolescents in school and public libraries. (3 cred.; prereq. 9 cred. in library methods; MWF II; 5Lib.) Miss McGregor.
- Lib.Meth. 67w. Library Printing. Preparation of copy, editing, proofreading, layout of library publications. Criticism of typical printed material. (1 cred.; no prereq.; T III; 5Lib.) Mr. Walter.
- Lib.Meth. 68s. Circulation Work. Lending systems and records. Library publicity. (1 cred.; prereq. 9 cred. in library methods; T III; 5Lib.) Mr. Walter.
- Lib.Meth. 69f. Current Library Problems. Discussion of typical problems and conditions in American libraries. (3 cred.; prereq. 9 cred. in library methods or simultaneously with Lib.Meth. 51, 52, 54; MWF II; 5Lib.) Mr. Walter.
- Lib.Meth. 70w. Current Library Problems. Continuation of Lib.Meth. 69. Library administration, college and university libraries, library buildings, library surveys, etc. (3 cred.; prereq. Lib.Meth. 69; MWF II; 5Lib.) Mr. Walter.
- Lib.Meth. 71w. Library Work with Children. Administration of children's rooms and book selection. (3 cred.; prereq. 9 cred. in library methods or 6 cred. and one 3-cred. course in library training simultaneously with 71; MWF I; 5Lib.) Miss McGregor.
- Lib.Meth. 72s. Library Work with Children. Continuation of Lib.Meth. 71. Further discussion of administration of children's rooms and book selection. (3 cred.; prereq. Lib.Meth. 71; MWF I; 5Lib.) Miss McGregor.
- Lib.Meth. 73f. Selection of Books for Adults. Principles of selection and criticism of representative books. Criticism and preparation of book lists. (2 cred.; no prereq.; ThS III; 5Lib.) Miss Hutchinson.
- Lib.Meth. 74w. Selection of Books for Adults. Continuation of Lib.Meth. 73. Further discussion of books and aids to book selection. (2 cred.; prereq. Lib.Meth. 73; ThS III; 5Lib.) Miss Hutchinson.
- Lib.Meth. 75s. Selection of Books for Adults. Continuation of Lib.Meth. 74. (2 cred.; prereq. Lib. Meth. 73, 74; ThS III; 5Lib.) Miss Hutchinson.
- Lib.Meth. 76s. Library Service in Hospitals. Organization and technical methods suitable for hospital libraries. (3 cred.; TThS I; 3Lib.) Miss Jones.
- Lib.Meth. 77s. Book Selection for Hospital Patients. Criticism and discussion of reading suitable for varied types of patients. Lectures, and assigned problems. (3 cred.; MWF IV; 3Lib.) Miss Jones, Miss Methven.
- Lib.Meth. 78s. Reading and the Mental Patient. Special problems of work with varied types of mental patients. (2 cred.; TS III; 3Lib.) Miss Jones.
- Lib.Meth. 79s. Medical Reference. Reference books and technical methods for hospital staffs. (3 cred.; MWF II; 314Lib.) Mr. Walter, Miss Anderson, Miss Norris.

Lib. Meth. 80s. Hospital Library Practice. A six-week internship in approved hospitals. (4 cred.; prereq. Lib. Meth. 76, 77, 78, 79.) Miss Methven.

Lib. Meth. 126s. Subject Bibliography. National and subject bibliographies of important countries. Special emphasis on research material and methods. (Prereq. senior or graduate standing, reading knowledge of French or German, and some experience in research or bibliographic study or projects; MWF I; 3Lib.) Mr. Russell.

## CURRICULUM IN THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

For the course in library training, leading to the degree of bachelor of science in the College of Science, Literature, and the Arts, a student must first complete satisfactorily three years of academic work. During his third year the student will elect work in the Senior College subject to the approval of the assistant dean for the Senior College. During these three years the student must secure at least 135 credits, and an average of one honor point per credit for all credits earned.\* At least 30 credits must be in Senior College courses. The student is subject to all the regulations which govern the work of other Arts students. He must complete his academic requirements before beginning the courses in library instruction.

*For admission to the fourth year of this course the student must secure the written approval of the assistant dean for the Senior College of the College of Science, Literature, and the Arts.*

During the fourth year a student will elect not less than 45 credits from courses listed on pages 6-8, and must maintain an average of one honor point per credit for all the credits earned.

College graduates technically ineligible for the degree who meet all other requirements and who complete satisfactorily a full year of work in the division will be given a certificate.

Students from other institutions desiring a degree in library training must meet the same specific requirements which students of the University of Minnesota must meet. A full college year of work is required for the degree in library instruction, hence "transfer credits" in this field cannot be accepted.

## COLLEGE OF EDUCATION SPECIALIZED CURRICULA FOR SCHOOL LIBRARIANS

The following curricula have been arranged in co-operation with the College of Education to offer professional library training to persons who desire to do library work in connection with the public schools.

Successful completion of one of the four-year curricula will entitle the student to the degree of bachelor of science. Curriculum A will also entitle the student to receive the Minnesota high school general certificate for teaching academic subjects in junior and senior high schools.

Students qualify for a secondary school certificate by completing requirements for a teaching major or two teaching minors in subjects commonly taught in Minnesota high schools. It will usually be wisest to choose majors and minors in the fields of English, history, and the social studies. Such students are required to take special methods and directed teaching in the teaching major or in one of the minors. They are also required to take five credits in education selected from the list of education electives. (See College of Education Bulletin.)

\* The number of credits required may be reduced by application of the "quality credit" rules given in paragraphs 34, 35, 36 on page 6 of the Bulletin of the College of Science, Literature, and the Arts, 1941-42.

Students registered in the College of Education are expected to do part of their practice work in the University High School library and part in another approved school library or public library branch doing school library work.

Graduates of the College of Education who already have an elementary or secondary school certificate and who complete an additional year of library training (45 credits) as registered students in the college, will be granted an official certificate for library work on satisfactory completion of a year's work in the division.

The College of Education requires of all students a C+ average in the major for graduation. The C+ average in these curricula is based on the 45 credits of library work.

#### A. FOUR-YEAR CURRICULUM FOR SCHOOL LIBRARIANS WITH CERTIFICATE FOR TEACHING ACADEMIC SUBJECTS

##### JUNIOR COLLEGE OF THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

###### *Freshman Year*

Course No.	Title	Credits
Eng. A-B-C	Freshman English .....	15
or		
Comp. 4-5-6	Freshman Composition (or exemption from the requirement).....	9
Hist. 1-2-3	European Civilization .....	12
	Language .....	15
Phys.Ed. 1-2-3	General Course in Physical Education.....	3
	<b>Total</b> .....	<b>45</b>

###### *Sophomore Year*

Psy. 1-2	General Psychology .....	6
	Natural Science .....	10
	Language .....	5
Phys.Ed. 4-7	General Course in Physical Education.....	2
	Electives† .....	24
	<b>Total</b> .....	<b>47</b>

#### COLLEGE OF EDUCATION

##### *Junior Year*

Lib.Meth. 52	Cataloging .....	3							
Lib.Meth. 54	Classification .....	3							
Lib.Meth. 62	Reference .....	3							
Lib.Meth. 57	<table border="0"> <tr> <td>{</td> <td>Secondary School Libraries</td> <td rowspan="3">} any two .....</td> <td rowspan="3">6</td> </tr> <tr> <td></td> <td>Public Library Administration</td> </tr> <tr> <td></td> <td>Selection of Books for Adolescents</td> </tr> </table>	{	Secondary School Libraries	} any two .....	6		Public Library Administration		Selection of Books for Adolescents
{		Secondary School Libraries	} any two .....			6			
		Public Library Administration							
	Selection of Books for Adolescents								
Lib.Meth. 58									
Lib.Meth. 64									
Lib.Meth. 71	Library Work with Children.....	3							
Ed. 51A-B-C	Introduction to Secondary School Teaching.....	9							
	Continuation of required elective academic courses†.....	18							
	<b>Total</b> .....	<b>45</b>							

##### *Senior Year*

Special Methods and Directed Teaching§.....	9
Completion of academic requirements—fall, winter, spring.	
Library courses .....	27
Electives in education†.....	5
General electives† .....	4
<b>Total</b> .....	<b>45</b>

† Electives should be selected to meet the requirements of one teaching major or two teaching minors. Electives should also include five credits selected from the list of professional courses on pp. 22-23 College of Education Bulletin, 1940-42.

§ Passing the qualifying examination in English is prerequisite to this course.

## B. SCHOOL LIBRARIANS WITHOUT TEACHING DUTIES

Students who wish to qualify as full-time librarians but *not as teachers* of academic subjects will be required to take 22½ selected quarter hours in education. These 22½ credits shall include Ed.51A-B-C, Introduction to Secondary School Teaching, or Ed.61A-B-C, Introduction to Elementary School Teaching, 9 credits; Lib.Meth.57, Secondary School Libraries, 3 credits; and Lib.Meth.61, Library Practice, 4½ credits. The remaining 6 credits are to be selected from the list of education electives. (See College of Education Bulletin.) The remainder of the curriculum is the same as Curriculum A.

### MINOR IN LIBRARY TRAINING

Students who complete 18 credits selected from Courses 52, 54, 57, 58, 62, 64, 71, and 72 will satisfy the requirement for a minor in library training in the College of Education.

## TRAINING FOR HOSPITAL LIBRARIANSHIP

A course in Hospital Librarianship is offered in the spring quarter. It is given with the active co-operation of the Minnesota State Department of Social Security, which has jurisdiction over all hospitals and other institutions for the sick, underprivileged, and the socially maladjusted, supported by the state. The demand for specially trained librarians for hospital, medical, and institutional libraries is increasing.

As far as a preliminary investigation indicates, no extended course of this kind is given in any other institution for the training of librarians. Lectures, discussions, reports, and observation and a six-week period of practice, or internship, in selected institutions are essential parts of the course. The regular instructors are assisted by a large group of medical and library experts in the special fields treated.

### CURRICULUM

The course, in addition to the prerequisites noted in the section on "Admission" (see below), includes the following specific courses in library methods: 76s, 77s, 78s, 80s. For details see pages 7-8.

### ADMISSION

Candidates for admission to this special course must have completed satisfactorily: (1) at least three years of approved college work and at least two quarters of work in an approved library school, or an equivalent of approved experience in hospital library work; and (2) the following courses or approved equivalent: Preventive Medicine and Public Health 50, Public and Personal Health (3 credits); Psychology 1-2, General (6 credits); Psychology 144-145, Abnormal Psychology (6 credits); Sociology 1, Introduction to Sociology (5 credits); Sociology 49, Social Pathology (3 credits); Sociology 90, Survey of Social Work (5 credits); Zoology 1-2-3, General Zoology (10 credits). Students are advised to register only for the entire group of courses, and no candidates for a special certificate will be excused from field observation and practice. Opportunity for individual study of problems of special interest will be given as far as practicable. All prospective students who have not taken their preliminary work at the University of Minnesota must apply for admission to this University and must submit their credentials to the recorder of the University of Minnesota, Minneapolis, Minnesota. Since each application



requires special consideration early application is extremely desirable. It is expected that only those who are genuinely interested in work in hospitals, who are physically able to do such work, are willing to accept positions in them, and have personal and educational qualifications for such work will apply.

*For admission both to the Library School and to the Course in Hospital Librarianship a special certificate must be secured from the assistant dean for the Senior College of the College of Science, Literature, and the Arts.*

Credit toward the degree bachelor of science will be given properly qualified students. Those who are not candidates or eligible for the degree, as well as graduates who satisfactorily complete this special work, will be given a special certificate for the satisfactory completion of the entire course, including the six weeks' internship. Students in this course will normally register in the College of Science, Literature, and the Arts and must comply with the regulations of that college as given in the Bulletin of General Information of the University.

## FEES AND EXPENSES

A fee of \$3.25 per credit hour for residents of Minnesota and \$4.50 for non-residents is charged for all courses under the jurisdiction of the Division of Library Instruction. Residents of Minnesota may elect the full 15 hours for \$42, non-residents, \$54. An incidental fee of \$8.50 for the quarter gives the student the privileges of the University Health Service, the Coffman Memorial Union, and certain other privileges. A matriculation deposit, \$10, is charged to cover locker rent, library fines, or damage to university property. The matriculation fee for students registered for less than five credits is \$5. Any unused balance will be refunded by mail after the beginning of the first quarter the student is no longer in attendance. Room and board costs from \$80 upward for the quarter. Further information and assistance regarding room and board can be obtained from the director of housing, University of Minnesota, Minneapolis, Minnesota. From \$40 to \$50 should be allowed for expenses while attending the field practice and internship. Textbooks will cost about \$25 for the year. Each prospective student should obtain the Bulletin of General Information, which is obtainable on application from the recorder, for further information regarding fees, expense, room and board, the general university requirements.

## REGISTRATION

Students should report for registration on the dates announced in the Bulletin of General Information. Registration and payment of fees must be completed within the period indicated. Later registration or late payment of fees is subject to increased fees.