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General Information for the Year 1939-1940

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UNIVERSITY OF MINNESOTA

MAIN CAMPUS

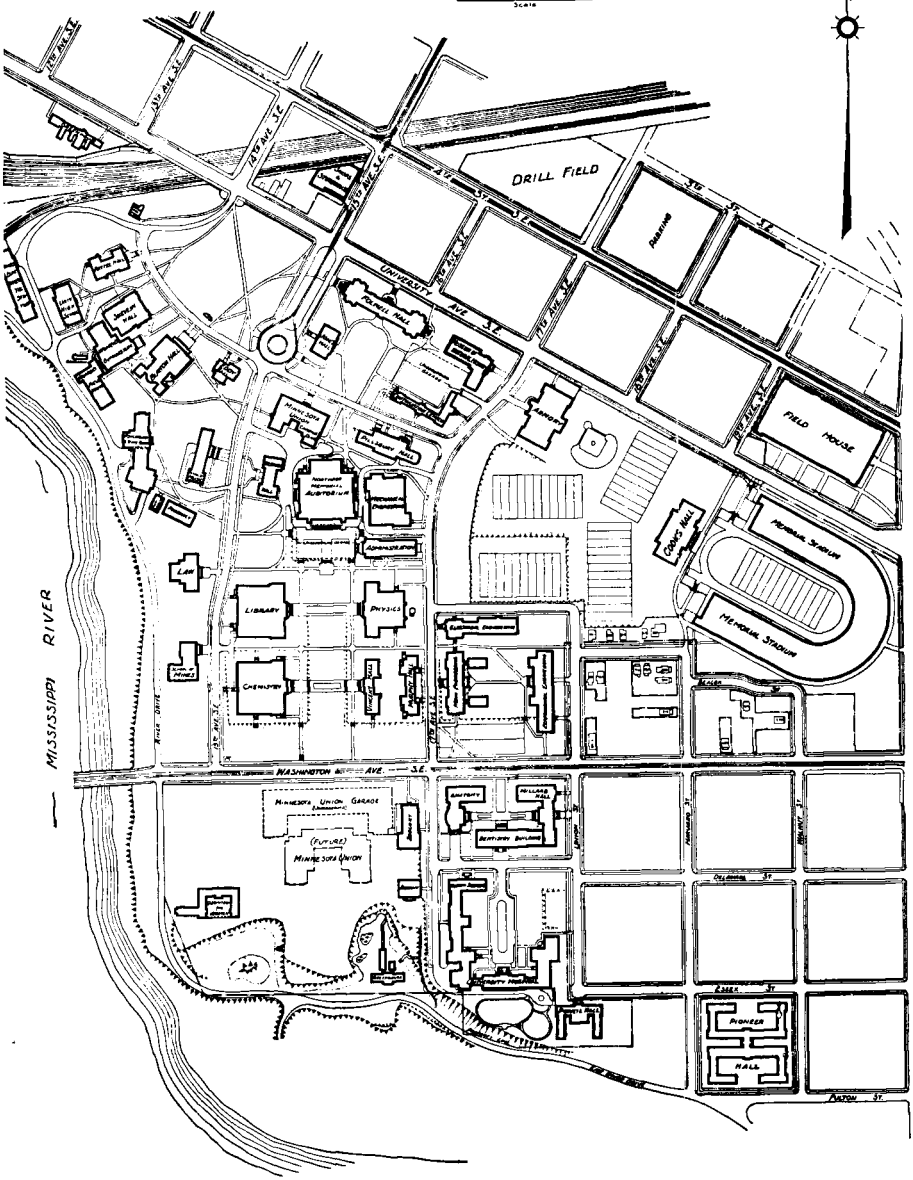


TABLE OF CONTENTS

APPENDIX

THE PURPOSE OF COLLEGE TRAINING

Each high school senior must decide which of four things he can and should do: go to work, if work be available, in the type of job for which he is already trained and which will give him satisfaction and success; enter a vocational school for such work as mechanical, secretarial, clerical, or general business; enter college to prepare for a profession; attend college for a year or two to secure that cultural and social training which will make life richer and more satisfying and assist in the making of a vocational choice. This decision can be made only after a student has determined accurately just what kinds and how much ability he has; and then he must discover in which part of the world's work he can use his ability with success and satisfaction to himself and others.

Each student must decide for himself whether he may profit from college training; this decision is to be made only in the light of his interests, desires, skills, and abilities, and by determining what he wants out of life. Human beings differ markedly from each other. A few are best suited for life-long study and research in library and laboratory; some for public service as in teaching, law, and governmental work; some for science as in medicine and engineering; some for management and administration in business; some for a combination of these with outdoor interests as in agriculture and forestry. But there is no short road to success in any of these. A college degree in any of these fields guarantees neither job nor success in the job if one is procured. Particularly is this true in modern society wherein unemployment is widespread and competition is keen. To meet such competition in the professions, a student must devote all his time and energy over a considerable period of years to both general and special preparation, to building himself up in knowledge, skill, and power to analyze and apply what he learns to real situations and problems.

College, university, and graduate professional study are offered primarily for those who have these qualities and who want intensely to become leaders in the field of their choice. But that many people do not really want to become leaders is indicated by the fact that even in college, a large proportion do not concentrate on preparation for leadership. There is much truth in the statement that most people fundamentally desire to live simply. They do not want to assume heavy burdens of responsibility. They really wish rather to strike a balance in their living, using their job as support for their marriage, home, social, and recreational activities.

On the other hand, some students desire to become leaders in a special field but do not have the combination of special skills and abilities which may be trained by the educational process for accomplishment. It is, therefore, necessary for each student to find

out all he can about himself. This may be done by thinking carefully about various tryout experiences in summer and part-time work, about the school courses he has liked best, found most profitable, and in which his achievement is of a high level. He should consult with his teachers to find out the answer to the questions: "What kind of a person am I? What are my special interests and my weaknesses?" And finally, each student should take as many of the achievement and aptitude tests as he can. Out of such an analysis is likely to come a judgment as to what he wants and can do.

Altho students should attempt to make a vocational decision before leaving high school, that choice need not, and in many cases should not, be too definite. Many have not had opportunity to try out their abilities adequately and others have not been well advised in judging what their experiences mean. For these students it is well to make a tentative choice and then to seek more experiences and advice before finally deciding.

Those students who decide to enter the University will find here facilities for helping them make a more definite vocational choice. After they have consulted high school teachers they should feel free to call upon the University for this service. Bulletins of the various colleges in the University contain descriptions of the general and professional training offered. The deans and advisers of the colleges are available for consultation. The University Testing Bureau also offers its services in deciding upon an occupation. It is advisable to visit the University during the summer to discuss vocational and other problems.

As each student attempts to understand himself, he probably will discover certain handicaps or weaknesses of which he was unaware. It is all too easy to hide weaknesses under a cloak of self-confidence. For example, some students discover that their ability to handle the mathematics of engineering subjects is less than they thought they possessed. Frequently these handicaps are so serious as to make necessary a change of vocational plans. In other cases it is necessary to take steps to overcome these handicaps through additional training. Some may be forced to recognize that it will be extremely difficult, if not impossible, to reach as high a professional goal as is desired. It is only by facing the results of such an analysis that students are prepared to understand serious professional training.

Some students choose a vocation, not because of interest or demonstrated ability, but because they have heard there are more opportunities for jobs in one vocation than in others. This is not a sensible way of making a choice. No one can guarantee that four years hence there will be plenty of jobs in such fields of work. Everyone recognizes that some fields are overcrowded now but he who can predict the future is indeed a prophet.

Because some students make the mistake of overemphasizing financial rewards as a measure of professional success, it is well to emphasize the fact that the state of Minnesota provides inexpensive professional training with the expectation that college graduates will contribute to social progress through better citizenship, civic and political leadership, or contributions to knowledge. In this connection, a number of students become interested in the occupation of research and teaching. Their desire to make a social contribution through training youth or through research should be encouraged and recognized as equal in importance to success in other professions.

After deciding upon an occupation and also where to get the necessary professional training, students should recognize that the University expects them to assume certain responsibilities in return for this training opportunity. The transition from high school to college may prove difficult for some if they fail to recognize they are undertaking a distinctly new type of work. College differs from high school in a number of respects. Instruction is given by means of lectures, textbooks, laboratory work, assigned reading to be done in the library, theme writing, translations and composition in foreign languages, class recitations and discussions, written quizzes, and final examinations. Various combinations of these methods of instruction are used in different subjects and by different instructors. Probably every student will have lectures in a considerable part of his work and will therefore need to develop skill in taking notes. Every student will find also that, as compared with the high school, more responsibility is left to him to do the assigned reading, to read and review his notes, to study the textbook, and to do all the things necessary to master each subject as presented by the instructor.

Students are especially urged not to allow themselves to fall behind in assignments but to work systematically day by day and week by week. They will be judged by the results of examinations and other required exercises. The efforts which the college makes at admission to help students to avoid work for which they are not fitted, are intended to save them from discouragement and failure. Every student is offered further advice and help as he goes along, but eventually those who cannot do the work or will not make the necessary effort must fail. College students are young men and women and must learn to assume responsibility.

NOTICE TO PROSPECTIVE STUDENTS

FRESHMAN STUDENTS

Every new student must file an application blank and an official copy of his record from the last school attended.

Application blanks may be obtained at any Minnesota high school, or from the registrar, University of Minnesota.

Applicants are advised to file these papers with the registrar not later than July 1.

Later applications will be accepted, but late applicants may be refused entrance through lack of time to make up discrepancies between the credits they present and the University's requirements for admission.

Whenever possible, credentials should be sent in directly by the proper official at the school last attended, and should not be presented in person by the student.

The university year is divided into four quarters. The fall, winter, and spring quarters make up the college year from September to June. The fourth quarter includes two summer terms.

Students may enter any college of the University at the opening of the fall quarter. The admission of new students at the opening of the winter and spring quarters is limited to those colleges of the University in which satisfactory programs can be arranged.

There is no restriction in the College of Science, Literature, and the Arts, General College, College of Agriculture, Forestry, and Home Economics, or College of Education.

Freshmen are advised not to enter the Institute of Technology, College of Pharmacy, or School for Dental Hygienists, except at the opening of the fall quarter unless merely a partial program of work is desired in preparation for regular admission in the fall.

Entering classes in Nursing are accepted at the opening of the fall and spring quarters.

Following are the more important registration dates for 1939-40:

Fall quarter

Freshman Week—Registration	September 25-26
Freshman Week	September 27-30
Classes begin	October 2

Winter quarter

Registration	January 2-3
Classes begin	January 4

Spring quarter

Registration	March 29-30
Classes begin	April 1

A detailed calendar for the year 1939-40 will be found on pages 50-51.

Freshmen entering any college except that of the Institute of Technology (Engineering and Architecture, Chemistry, and Mines and Metallurgy) are required to write the college aptitude test. Freshmen entering the College of Science, Literature, and the Arts, College of Education, College of Pharmacy, and Institute of Technology are required to write an English placement test and an English theme. Applicants from Minnesota high schools should take advantage of the opportunity to write these tests as offered during their senior year in high school. Other applicants may take the tests at the University at any time and are urged to do so if possible before Freshman Week in order to avoid delays in registration.

Each applicant must present for registration:

a. Admission certificate as issued by the Board of Admissions.
b. The necessary test cards for the college for which he is applying.

Read the Instructions for Registration carefully noting: (a) the place to report; (b) the time of reporting; (c) the documents which must be presented and how they are to be obtained.

Instructions for Registration will be mailed with the admission certificate or, following the admission certificate, about a month before the opening of the quarter.

STUDENTS ENTERING WITH ADVANCED STANDING

Each applicant is required to file with the Board of Admissions:

a. Application blank properly filled out. (Blanks may be obtained from any Minnesota state high school or from the registrar, University of Minnesota, Minneapolis.)
b. An official transcript of record from any college previously attended.
c. An honorable dismissal from the last institution attended.

Transcripts of record and letters of honorable dismissal should be sent direct from the institution concerned to the University of Minnesota and should not be presented in person by the applicant.

Applicants who are unable to present at least a full year of advanced standing will be admitted as freshmen on the basis of their high school credits and should present the same documents and follow the same procedure as outlined for freshmen in the foregoing section and in the Instructions for Registration.

Each applicant must present for registration:

a. Admission certificate as issued by the Board of Admissions.
b. Record of advanced standing.

Read the Instructions for Registration carefully noting: (a) the place to report; (b) the time of reporting; (c) the documents which must be presented and how they are to be obtained.

Instructions for Registration will be mailed with the admission certificate or, following the admission certificate, about a month before the opening of the quarter.

FRESHMAN WEEK

The University recognizes the need of giving its newly entering students an introduction to their work and to university life which is new and strange to them. For this purpose it requires freshmen to come to the University for part of the week before classes begin. This Freshman Week is devoted to efforts to help the freshman get a right start.

The period of September 27-30, inclusive, will be used by the freshman for the following duties:

a. Making his living arrangements.
b. Registration and paying his fees.
c. Physical examination. (Physical examinations for women are conducted by women physicians.)
d. Aptitude tests.
e. Other tests or examinations which will enable the faculty to place him in the class for which he is best fitted.
f. Interviews with advisers.
g. Hearing lectures on such subjects as:
    1. The use of the library.
    2. How to study.
h. Making visits to acquaint himself with the University Library, scientific laboratories, and other points of interest in connection with his choice of studies and future occupations.
i. Special exercises intended to acquaint him with the peculiar conditions or requirements of the college which he enters.
j. Musical and social entertainment in the evenings arranged with the co-operation of the Student Council and the various religious bodies.

During the process of registration faculty advisers talk with all students, helping them to make the best selection of studies.

The Committee on Vocational Information is in session for conferences with freshmen regarding their general vocational and educational problems.

Administrative officers, faculty, student government councils, upper class students, and organizations for religious work all co-operate to make Freshman Week a period during which the freshmen find themselves, learn how to go about their university work, and how to profit by the opportunities for recreation.

NOTE THAT ALL FRESHMEN MUST REGISTER FOR FRESHMAN WEEK BEFORE SEPTEMBER 27 AND MUST BE IN ATTENDANCE THROUGHOUT THE FRESHMAN WEEK PERIOD CLOSING ON SEPTEMBER 30.

All who have not completed the psychological and English tests must report not later than Monday, September 25.

COURSES AND DEGREES

Brief summarized statements of the courses of study offered by the University of Minnesota, together with the degree to which each leads, are listed below.

The University does not issue a complete catalog of courses in one volume but a full outline of each of these courses of study together with descriptions of the subject-matter courses which they include will be found in the announcement of the college or school in which the course of study is offered.

These announcements may be obtained by addressing the Registrar, University of Minnesota, Minneapolis, Minnesota.

GENERAL COLLEGE

The General College is a new departure in education. Basically it provides a two-year curriculum of general education leading to the degree of associate in arts. A broad program of courses is available from which the individual student, under guidance plans his own curriculum. General education aims essentially to produce well-rounded individuals who will be able to meet and understand the variety of common activities and problems encountered in the business of earning a living, as a member of a home and family group, as an individual consciously or unconsciously seeking numerous personal values, and as a citizen of a community, a state, a nation, and a world.

To achieve these purposes, core courses have been set up directed toward individual, home life, social-civic, and vocational orientation. A wide variety of other courses is available from which electives may be chosen by the individual student in terms of his special needs and interests. In addition to study in the four orientation areas, students may elect two subject-matter fields of interest. Areas from which these may be chosen are general arts; euthenics; human development; literature, speech, and writing; the physical, and the social sciences.

Emphasis is placed upon contemporary society throughout the teaching, with sufficient relating to the past and pointing to the future to understand the present and its problems. A wide variety of courses is available in economics; government; history; sociology; the biological and physical sciences; literature, speech, and writing; mathematics of business; psychology; human development; euthenics; and the arts. The arts include study of film and drama, music today, and the graphic arts.

Vocational orientation offers field trips and special laboratory sections for a small group study of common problems. Individual help, discussion sections, visual education equipment, comprehensive examinations, a writing laboratory, and special work in speech offer the opportunity to every student to make his college work a real and vital part of his living now and in the future.

Combination programs of courses in special fields in other departments together with courses in the General College can be arranged to meet the needs of individual students. A limited number of students in other colleges may also be permitted to take work in the General College. The usual provision has been made to accommodate adult auditors.

The degree, associate in arts, is granted upon the passing of six comprehensive examinations. Possible exemptions from this requirement, based upon comparable work in other colleges, may be granted by the director. Eligibility for transfer to other colleges is determined by the scope and quality of work done in this college. The evaluation of credits accepted for transfer is in the hands of the receiving college.

Provision is made for the counseling and guidance of individual students as this is needed in connection with personal, educational, or vocational problems. Individual needs, desires, and abilities will be recognized and combination programs made out when the needs of students can be best served in this manner. The counselors and instructors of the General College are available at all times to help students with their many problems and questions, in order that their university study may be made interesting, valuable, and meaningful.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

The College of Science, Literature, and the Arts serves four main groups of students in the University: (1) students who are taking a four-year course as candidates for the degree of bachelor of arts or the degree of bachelor of science given by this college; (2) those who are taking the first four years of a course of study which requires five or more years and which prepares them for a definite vocation or profession; (3) those who are candidates for a bachelor of arts degree in a combined course consisting of three years of work in this college and of one or more years of work in a professional school; (4) those who are taking the minimum requirement of college work, from one to three years, for admission to a professional school:

I. *The four-year course leading to the degree of bachelor of arts or bachelor of science.*—The course of study is elective under certain broad limitations. It is expected that the four-year course will be a period of intellectual growth. Each student begins with relatively elementary studies in the freshman and sophomore years and goes on in the junior and senior years to more advanced and intensive studies. In the first two years the student is required to make suitable preparation for the advanced studies. At the beginning of the last two years, the student is expected to select a field of major interest and, with the help and approval of an adviser, to plan his program of studies around this as a nucleus. The student, however, who has a definite plan for his own college course, not involving specialization, may be given permission to pursue an individual program suited to his own needs and interests.

Altho the College of Science, Literature, and the Arts does not in general give vocational training, students with a professional interest in music, journalism, library training, or public health, may specialize as follows:

Music.—A four-year course leading to the degree of bachelor of arts, in which the theoretical and practical work in music is combined with the study of psychology, modern languages, English literature, and history. The object is to provide a well-rounded cultural course for those who are preparing for professional work in music.

Journalism.—Professional training in this field is given by a major in the Department of Journalism together with required or advised work in other fields.

Library Service.—A four-year course including three years in this college and a full year (45 quarter credits) in professional library instruction subjects. At the end of the fourth year students may receive the degree bachelor of science. The same degree is also given to college graduates who take a complete year in Library Instruction.

Preventive Medicine and Public Health.—Students in this college may major in this field.

II. *Specialized curricula of five or more years.*—The following specialized curricula are offered in the College of Science, Literature, and the Arts:

Course in Training for Public Administration.—A six-year course, during the first four years of which the student pursues a program of liberal education with a major in political science and a minor in one of the other social sciences, or a major in some field of specialization represented in government service and a minor in political science. The fifth year is devoted to advanced studies in public administration, public law, and related subjects. Internship training with a governmental agency is arranged for the sixth year. The degree of bachelor of arts or bachelor of science is given at the end of four years; the degree of master of arts in public administration is conferred upon the completion of the sixth year.

Course in Training for Diplomatic and Consular Service.—A five-year course leading to the degree of bachelor of arts at the end of the first four years. At the end of the fifth year students whose programs satisfy the requirements of the Graduate School may receive the degree of master of arts.

Course in Training for Social Work.—A six-year course, during the first four years of which the student secures a broad education with special attention to history, economics, political science, and sociology. The fifth and sixth years are devoted to technical subjects and professional training in social work. The degree of bachelor of science is given at the end of four years; a special certificate and the degree of master of arts are conferred upon the completion of the sixth year.

III. *Combined arts and professional courses.*—The College of Science, Literature, and the Arts offers the following combined arts and professional courses:

Combined course in Arts and Medicine.—An eight-year course leading to the degrees of bachelor of science and doctor of medicine, and an eight-year course leading to the degrees of bachelor of arts and doctor of medicine.

Combined course in Arts and Law.—A seven-year course leading to the degrees of bachelor of arts and bachelor of laws.

Combined course in Arts and Dentistry.—A six-year course leading to the degrees of bachelor of arts at the end of five years and doctor of dental surgery at the end of the sixth year.

Combined course in Arts and Architecture.—A six-year course in Arts and Architecture leading to the degrees of bachelor of arts at the end of four years and bachelor of architecture at the end of the sixth year.

Combined course in Arts and Interior Architecture.—A four-year course leading to the degree of bachelor of interior architecture. The third and fourth years are spent in the Institute of Technology.

IV. *Preprofessional training.*—In this college is given also the academic work required for admission to the Medical School, the Law School, the School of Dentistry, the School of Business Administration, and the College of Education; and also the courses preliminary to (1) nursing education in the College of Education and (2) training for medical technologists in the Medical School.

INSTITUTE OF TECHNOLOGY

The Institute of Technology, established in 1935, embraces the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy.

The College of Engineering and Architecture offers professional courses of study in the following fields:

Aeronautical Engineering
Civil Engineering
Electrical Engineering
Mechanical Engineering
Engineering Prebusiness
Engineering and Business Administration (5 years)
Architecture (5 years)
Interior Architecture
Agricultural Engineering (in co-operation with the College of Agriculture, Forestry, and Home Economics)

The School of Chemistry offers professional courses of study in the following fields:

Chemistry
Chemical Engineering
Physics
Chemistry or Chemical Engineering and Business Administration (5 years)

The four-year course leading to the degree of bachelor of physics (B.Phys.) includes a minimum of 55 credits in physics, 34 credits in mathematics, and 39 credits in chemistry. The course is designed for students who desire to enter the field of industrial physics or special graduate work in physics as a major.

Each of these courses leads to the Bachelor's degree in the respective field (as bachelor of aeronautical engineering or bachelor of chemistry). Optional groups of electives are available in some of the courses for students who desire to devote special attention to certain branches, such as Engineering Administration.

The School of Mines and Metallurgy offers professional four-year courses of study in the following fields:

Mining Engineering	Petroleum Engineering
Geological Engineering	Metallurgical Engineering

These courses lead to the respective degrees: bachelor of mining engineering, bachelor of geological engineering, bachelor of petroleum engineering, and bachelor of metallurgical engineering.

The Engineering Prebusiness Course requires the first two years of work in the Institute of Technology. This is followed by two years in the School of Business Administration upon the satisfactory completion of which the degree of bachelor of business administration is conferred.

Five-year combined courses in *Engineering and Business Administration* are available for students who desire more extensive preparation for administrative positions while including one of the regular engineering or chemistry curricula. The student is thus able to obtain the degree of bachelor of business administration at the end of the fifth year, after having also completed his engineering or chemistry course for his Bachelor's degree.

The first two years of the course in *Interior Architecture* are taken in the College of Science, Literature, and the Arts, and the last two years in the Institute of Technology.

Work is also offered in the Graduate School leading to the Master's degree in the appropriate branch of engineering, architecture, or chemistry, or to the Doctor's degree.

The professional degree of aeronautical, agricultural, chemical, civil, electrical, or mechanical engineer will be conferred upon those who have received the Bachelor's degree in the corresponding field of engineering when they have completed the equivalent of one additional year's college work in that field, and four years of approved engineering experience in positions of responsibility, and have presented a satisfactory professional thesis. Graduates of this University 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 or some other university and that the Master's degree be obtained in this manner. There are many advantages in taking this year of study immediately following graduation from the four-year course, thus making a five-year course leading to the Master's degree. Then after four years of approved experience and the preparation of the thesis, the professional 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 professional engineer degree register in the Graduate School.

The Engineering Experiment Station is a research organization, which provides facilities for studies, experiments, and investigations in the various fields of engineering and architecture, under the direction of members of the staff. Several research assistantships are available for part-time graduate students. Results of investigations are published in the Bulletin of the Engineering Experiment Station. Research funds are provided by industries in some cases to support special studies.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

The College of Agriculture, Forestry, and Home Economics offers (a) four-year courses in the fields of agriculture, forestry, and home economics, leading to the bachelor of science or equivalent degree, and (b) five-year curricula in Forestry leading to the degree of master of forestry.

The following curricula are offered:

SCIENCE SPECIALIZATION CURRICULUM

This curriculum provides for more intense specialization, particularly in the sciences basic to many fields of agriculture, forestry, and home economics. Only that amount of technical training in practical fields is required which deals with the special science or field selected. Selection of the Science Specialization Curriculum should, in practically all cases, be followed by graduate study to at least the Master's degree. Students who do not have records in high school considerably above average should not attempt the science curricula.

AGRICULTURE

Technical Agriculture Curricula.—These curricula are arranged for students who plan to enter one or more of the technical or applied fields of agriculture immediately upon graduation. Students may, however, continue in graduate work for further specialization. Training is offered for all types of farming in this area, for county agent and extension work, and for technical agricultural work in agricultural industries in dairy and animal husbandry, agronomy and plant industries, horticulture, agricultural engineering, landscape gardening, farm management, agricultural economics, and agricultural business.

Food Technology Curriculum.—This curriculum provides special training in preparation for industrial fields such as meat packing; processing, storage, and distribution of fruits, vegetables, and other perishables; canning and pickling. It includes also milk products and the products of milling and related industries. Specialties in these fields may involve major subject-matter specialties in chemistry, bacteriology, and other special biological fields. Students intending to enter the Food Technology Curriculum should have a fairly definite professional or vocational program and must consult the special faculty advisory committee for this curriculum (see the registrar or the office of the dean of the college), with whose approval a program of subject-matter courses may be selected under the limits described. The curriculum presented is intended merely to show the wide range of available subject-matter courses, especially those basic to the whole field, from which the student must select those best suited for his particular program. While this is a normal four-year curriculum certain scientific specialties may demand graduate work.

While the employment possibilities are probably chiefly in the various food industries, additional opportunities exist in research and in teaching in connection with various federal, state, and municipal government bureaus and offices as well as in colleges and in private research institutions.

Wildlife Management Curriculum.—Open to students registering according to the various following curricular patterns in the fields of forestry and agriculture: Forestry (game management), Technical Agriculture, Agricultural and Forest Sciences. (See Wildlife Management Curriculum in the Bulletin of the College of Agriculture, Forestry, and Home Economics.) The curriculum or pattern will be selected and built up with the aid of an adviser for the special vocational or professional objectives which the student has in mind. The work involves a wide range of activities including the management of upland game, big game, waterfowl, fish, and fur bearers in parks and forests and on wildlife preserves and privately owned lands; it also includes the artificial propagation of game and fur species and the encouragement of nongame species. Students may also prepare themselves for teaching in colleges and universities, for research and experimental work in various state and federal departments, and for management and extension work in state and federal departments concerned with utilization of our natural resources.

Preveterinary Medicine Curriculum.—This curriculum of one year may vary in accordance with the veterinary college to be selected by the student. In general, the requirements would follow the plan of the Agricultural Science Curriculum, but special variations from this curriculum may be provided upon recommendation of the adviser. Because of the grade requirements for entrance to veterinary colleges an average grade of close to B in preveterinary medicine is essential.

Agricultural Education Curriculum.—Designed especially for those who plan to teach agriculture in the public schools. This curriculum (given jointly with the College of Education) follows in general the technical agriculture groups and permits emphasis on majors in special technical agricultural fields, such as dairying, horticulture, farm management, etc. In addition, it offers special training in education and leads to certificates for teaching agriculture and sciences in elementary and high schools of the state.

Agricultural Engineering Professional Curriculum.—Offered jointly with the Institute of Technology. This is a technical engineering course leading to the degree of bachelor of agricultural engineering. The first two years are spent largely in work in the Institute of Technology and the last two in work in the College of Agriculture, Forestry, and Home Economics and the Institute of Technology. High school mathematical preparation required for all engineering curricula is also required here. The Agricultural Engineering Professional Curriculum is designed to train specialists in various types of engineering fundamental to agricultural practices and industries.

Students desiring a major in agricultural engineering with special reference to the technical application and without the professional engineering training should register for a Technical Agriculture Curriculum.

Agricultural Engineering Business Administration Curriculum.—Offered jointly with the Institute of Technology and the School of Business Administration. This is a technical engineering and business curriculum with emphasis in the field of agriculture. The preliminary requirements are similar to those of the Agricultural Engineering Professional Curriculum.

In addition to the professional work in engineering, a complete sequence of business courses is required together with a sequence of agricultural courses. Students completing this curriculum will receive the degree both of bachelor of agricultural engineering and bachelor of business administration.

Agricultural Business Administration Curriculum.—Offered jointly with the School of Business Administration. Designed for those who wish to prepare for some branch of agricultural business, such as marketing, finance, farm real estate, merchandising, etc. More opportunity is offered for business and economic courses than in the Technical Agriculture Curricula, where greater stress is on the agricultural subjects.

Agricultural Journalism Curriculum.—Offered jointly with the Department of Journalism of the College of Science, Literature, and the Arts. Designed for those who wish to prepare especially for some field of journalism relating to agriculture. The student is offered general courses in technical agriculture, but the major part of the last three years is occupied with special preparation for technical journalism. Particular stress is also laid on economic and business courses related to agriculture.

See also "Forestry and Biological Station," held during the second term of the Summer Session (page 27).

FORESTRY

The Division of Forestry offers three five-year curricula in professional forestry leading to the master of forestry degree and two four-year technological curricula leading to the bachelor of science degree. On completing the requirements of the first four years of the various professional curricula the student will receive the bachelor of science degree, which does not, however, complete the training for professional work in forestry. The professional degree of master of forestry is conferred only upon the completion of an additional year.

Five-Year Professional Curricula

General Forestry Curriculum.—Preparation for technical forest work in public and private service involving management of forests and forest crops.

Range Management Curriculum.—Preparation for range and forest management work.

Game Management Curriculum.—Preparation for combined forestry and wildlife management (game management). See also under Agriculture, page 15.

Four-Year Technological Curricula

Commercial Lumbering Curriculum.—For those who wish to enter some field of commercial lumbering.

Forest Technology Curriculum.—Preparation for manufacture of pulp, paper, and other wood products and for such technological fields as wood seasoning, wood preservation, etc.

See also "Forestry and Biological Station," held during the second term of the Summer Session (page 27).

Forest Sciences.—See Science Specialization Curriculum, page 15.

HOME ECONOMICS

Curriculum for Dietitians.—For women expecting to become hospital dietitians. Students selecting this course should be sure of an aptitude for, and ability in, the physical and biological sciences and should have a high school record of better than average.

Curriculum for Home Economics Education.—Offered jointly with the College of Education for those who wish to teach home economics in the high schools and obtain a teacher's certificate. Students should have a high school record of better than average and should have an interest in and an ability to work with young people.

Curriculum for Home Economics in Business.—For students planning to enter business fields that are closely related to home economics, such as foods and nutrition, related art, textiles and clothing. Given with the co-operation of the School of Business Administration.

Curriculum for Institution Management.—Preparation for management of such institutions as tearooms, cafeterias, dormitories, institutional homes, etc.

Curriculum for General Home Economics.—A college course in Home Economics offering a broad, general education designed especially for the important business of homemaking.

Home Economics and Nursery School Education.—A combination course designed for those who have ability and interest in the two fields.

Curriculum for Preparation for Research in (a) Textiles and Clothing or (b) Foods and Nutrition.—An undergraduate preparation for graduate work as a basis for more intense specialization in these fields of home economics research. For those who plan a scientific research career. Students who do not have a high school record or a college freshman record considerably above the average should not attempt this course. Graduate work to at least the Master's degree is assumed.

Curriculum for College Teaching.—A specialized curriculum for undergraduate preparation for graduate work leading to teaching home economics at the college level. Previous teaching experience and special aptitude are essential. Graduate work is, of course, assumed.

Home Economics Related Science Curriculum.—Opportunity is offered for emphasis on the sciences basic to certain fields in home economics. It is assumed that the student will take graduate work at least to the Master's degree. This curriculum should be chosen only by those who have an excellent high school record and an aptitude for science.

See Organization of the University page 48 for a statement of other activities of the Department of Agriculture.

LAW SCHOOL

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 below.

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 for students who have a college degree when they begin the study of law, *the subjects specified in the prelaw course* (see the Bulletin of the College of Science, Literature, and the Arts or the Bulletin of the Law School), 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 these two years, or of not less than 73 for all the work of these two years combined. The additional two years of study are devoted to advanced courses in law, including practice, pleading, evidence, judicial administration, administrative law, jurisprudence, and legislation. About half of the work of these two years is prescribed; the remainder 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.

The College of Science, Literature, and the Arts and the Law School offer a combined seven-year course in arts and law leading to the degrees of bachelor of arts and bachelor of laws. (See the Bulletin of the College of Science, Literature, and the Arts or the Bulletin of the Law School.)

The School of Business Administration and the Law School offer a combined seven-year course leading to the degrees of bachelor of business administration and bachelor of laws. (See the Bulletin of the School of Business Administration or the Bulletin of the Law School.)

The Law School affords an opportunity for a course leading to the degree of master of laws, under the direction of the Graduate School. Candidates must have completed two years of college work and must have secured the degree of bachelor of laws from a school which is a member of the Association of American Law Schools.

MEDICAL SCHOOL

The Medical School offers three principal courses: one for physicians, one for nurses, one for medical technologists.

The Medical Course proper leads to the degree of doctor of medicine and the usual career of graduates is the practice of medicine. The minimum

preparation for entering this course is three years of college work, including general zoology, genetics, psychology, general, organic, and physical chemistry, physics, English, and a reading knowledge of German.

Altho three years of college work will constitute the minimum requirement for admission to the Medical School, a physician should have a thoro and broad education. Hence, students are advised to take four years of college work before beginning the medical course; and, other qualifications being approximately equal, the Admissions Committee will give preference to those applicants who have had the better educational background. The time during these three (or four) years of college work which is not taken up with specifically required subjects should be devoted to a program of studies, carefully selected to serve as a background for a liberal education. (See Medical School Bulletin for details of entrance requirements and for suggestions for elective studies.)

Premedical study may be pursued in any good college. The medical course is four years in length and leads, at Minnesota, to the degree of bachelor of medicine. After a further year as intern (that is, resident doctor) in some good hospital, the student is granted his degree of doctor of medicine. He may then engage in practice or undertake additional graduate work as preparation for the practice of a specialty or for a career in teaching and research.

It will be seen that the complete time of study for a physician is eight or nine years above the high school. The course is difficult and only competent students should undertake it.

The School of Nursing offers a five-year combined course leading to the degrees of bachelor of science and graduate in nursing. The first five quarters in this course may be spent in any good university and are devoted to the study of biological and other sciences, and to additional cultural courses fundamental to nursing. The next two and one-half years are spent in the clinical field of hospital, outpatient, or other community nursing practice. The last three quarters (one academic year) are divided between the clinical field (a chosen elective), and academic work contiguous to nursing.

Students taking this course are prepared, depending upon their choice of elective in the last year, for positions of bedside nursing, administration, supervision, teaching, school nursing, public health nursing, and other similar types.

The work of present-day nursing demands a comprehensive preparation such as may be secured in the five-year combined course. Graduates of this course are in demand and hold excellent positions in the various representative nursing fields in this country and abroad.

The school offers, also, a three-year course leading to a diploma of graduate in nursing. High school graduates meeting the entrance requirements to the College of Science, Literature, and the Arts of the University are eligible for this course.

The School of Nursing co-operates with the College of Education in offering a course in nursing education for graduate nurses leading to a degree of bachelor of science.

The school provides, in addition, postgraduate courses in communicable disease, medical, surgical, operating room, pediatric, and obstetrical nursing. These courses are twelve months in length and include clinical experience within the hospital and in other phases of community nursing practice outside the hospital. Students in these courses are expected to carry the equivalent of one-half year of related scientific and other academic work during the year. Nurses completing these courses are prepared primarily for combined administrative and teaching head nurse positions.

The school receives students from affiliating schools for class and clinical experience in such fields as medical, surgical, obstetrical, pediatric, dietary, gynecological, communicable, and outpatient phases of nursing.

For extension and summer courses see bulletins of the General Extention Division and the Summer Session, respectively.

Public Health Nursing.—Courses in public health nursing are conducted in the Medical School under the direction of the Department of Preventive Medicine and Public Health. Graduate nurses who are eligible and seniors in the five-year nursing course may secure the degree of bachelor of science with a major in public health nursing. Graduate courses in public health leading to a Master's degree are also available for qualified public health nurses. Students who are interested should ask the registrar for application blanks including the nursing supplement and should direct special inquiry to the Director, Public Health Nursing Course, 121 Millard Hall, University of Minnesota, Minneapolis, Minnesota.

The Course for Medical Technologists is four years in length and leads to the degree of bachelor of science. Three years are devoted to college study with emphasis on courses in biological and chemical science. The fourth year of training is taken in a hospital laboratory gaining actual experience.

A medical technologist is trained to make accurate medical tests, such as chemical analyses, microscopic examinations, X ray, etc. This work requires intelligence and reliability of high order.

The Course in Embalming.—See the Bulletin of the Course in Embalming. Much of this course is given in the Medical School under the administration of the General Extension Division.

Short courses for physicians are offered throughout the year by the medical faculty and other specialists under the administration of the General Extension Division and the Center for Continuation Study.

SCHOOL OF DENTISTRY

The School of Dentistry offers two principal courses—a four-year course for dentists and a two-year course for dental hygienists.

The course in dentistry leads to the degree of doctor of dental surgery and prepares graduates to engage in the practice of dentistry. The minimum requirement for admission to the School of Dentistry is the completion of a four-year high school course and two years of college work, sixty (60) semester or ninety (90) quarter credits. The two years of predental work may be taken in the College of Science, Literature, and the Arts at the University of Minnesota or at any accredited university or college.

The predental course must include English and the sciences of chemistry, physics, and zoology. All the other subjects are elective, but the student is advised to secure as broad and as cultural an education as possible by selecting courses such as psychology, sociology, history, economics, statistics, and government. Technical drawing is also recommended as valuable training for a prospective dentist.

A broad, cultural education is of such great value to the professional man that the University of Minnesota offers the opportunity for a student to secure both the bachelor of arts and the doctor of dental surgery degrees in seven years. To accomplish this the student completes three years' work with a satisfactory record in the College of Science, Literature, and the Arts, and then enters the School of Dentistry. Upon the completion of the accredited medical science subjects in the first two years of the dental curriculum, the student becomes eligible for the bachelor of arts degree from the College of Science, Literature, and the Arts. Upon the completion of the required curriculum of the School of Dentistry, the student is recommended by the faculty in dentistry for the degree doctor of dental surgery.

After graduation a dentist secures a license to practice by passing the State Board Dental Examination required by the state in which he desires to locate.

Graduate work in dentistry.—Graduate work leading to the master of science degree in dentistry is offered under the direction of a joint committee in Dentistry and Medicine and under the supervision of the Graduate School of the University. Candidates for admission must be graduates of an acceptable dental school and have had at least two years of preliminary general college work. Completion of the work for a degree will normally require three years of graduate work.

Extension courses.—Courses in Crown and Bridge Work, Oral Surgery, Orthodontia, and Prosthetic Dentistry are conducted from time to time by the General Extension Division, for the benefit of dental practitioners.

The School for Dental Hygienists.—The Course for Dental Hygienists is offered by the School of Dentistry. Admission is based upon the completion of a four-year high school course or its equivalent. It offers to young women a two-year university course leading to the degree graduate dental hygienist.

The subjects included in this course aim to prepare young women for educational and practical dental hygiene work in public schools, hospitals, industrial institutions, and private dental offices. The cultural subjects include English composition, sociology, psychology, and public speaking. Physiology, physiological chemistry, zoology, bacteriology, and elementary anatomy serve as the fundamental background for the specialized courses pertaining to dental hygiene and pathology. Dental prophylaxis, administration of anesthetics, X ray, and dental laboratory technic, and assisting at the dental chair are included in the course of training. Instruction in office methods, records, banking, typewriting, and correspondence helps to prepare the dental hygienist for the various duties she performs.

Upon graduation the dental hygienist is required to pass the Minnesota State Board Examination in order to secure a license to practice dental hygiene within the state. Thirty-four other states have similar laws governing the practice of dental hygiene.

COLLEGE OF PHARMACY

The College of Pharmacy offers one undergraduate course of four years' duration leading to the degree bachelor of science in pharmacy. This course includes one year of work in certain subjects in the College of Science, Literature, and the Arts, or other colleges of equal standing.

Beginning with the fall quarter of 1938-39, the College of Pharmacy and the School of Business Administration will offer an optional combined five-year course in Pharmacy and Business Administration leading to the degrees of bachelor of science in pharmacy and bachelor of business administration. This optional course is open only to those students who register in the College of Pharmacy either with or without advanced standing and who can present evidence of better than average ability. Students who are permitted to register for this course of study must take the professional and business administration courses in the sequences in which they are offered.

Graduate study with major work in pharmacy, pharmaceutical chemistry, and pharmacognosy and pharmaceutical botany, leading to the degrees of master of science and doctor of philosophy, respectively, is offered by the Graduate School. The graduate work is open to those who have received the degree bachelor of science in pharmacy from the four-year course of this or some other college of pharmacy of similar standing. Only those who have shown exceptional scholarship and capacity in the undergraduate course and possess unquestioned ability to carry on independent research will be accepted for advanced work.

COLLEGE OF EDUCATION

The College of Education offers many courses of study designed to train students for the different positions in public and private schools and in other educational agencies. The satisfactory completion of a four-year course leads to the bachelor of science degree and to a certificate for school work from the Minnesota State Department of Education. In many cases a five-year program leads to the Master's degree.

Some of the courses of study prepare the student to teach an academic subject in high school, as English, German, history, or science, or to teach one of the special subjects as agriculture, art, business subjects, home economics, industrial arts, natural science, physical education, health subjects, or music education. Other courses of study entitle the graduate to the kindergarten-primary certificate, or to the elementary school or junior high school certificate, and prepare for positions in nursery schools, kindergartens, elementary schools, and junior high schools. There are also courses of study for teachers of subnormal children, for visiting teachers, or teachers of

speech correction, and for those interested in educational and vocational guidance, psychological testing in schools, public school health work, public health nursing, and nursing education.

At the graduate level specialized programs in administration and supervision prepare for positions as superintendents of schools, principals of elementary schools and high schools, supervisors of elementary and high school subjects, critic teachers in teachers colleges and practice schools, and teachers of professional education subjects. Special courses planned for certification in administration and supervision are available.

In nearly all cases the student registers for two years in the College of Science, Literature, and the Arts and transfers to the College of Education at the beginning of the junior year. In certain courses of study, as in elementary education and commercial education, a number of prerequisite subjects must be completed during the junior college period. In art education, industrial education, physical education, music education, and school health work, the student registers in the College of Education as a freshman. In agriculture and home economics the freshman and sophomore years are taken in the College of Agriculture, Forestry, and Home Economics. The programs in nursing education and public health nursing are based on preliminary work in the School of Nursing.

SCHOOL OF BUSINESS ADMINISTRATION

The School of Business Administration offers a two-year course leading to the degree of bachelor of business administration. This course requires as a prerequisite the completion of two years of work in the College of Science, Literature, and the Arts, the Institute of Technology, or the College of Agriculture, Forestry, and Home Economics in which certain prebusiness courses are prescribed.

In addition to the general courses in business, several specialized sequences are offered. Among them are courses in Accounting, Advertising, Agricultural Business, Finance, Insurance, Merchandising, Department Store Training, Foreign Trade, Personnel Management, Industrial Administration, Traffic and Transportation, Secretarial Training, Statistics, and Office Management. In each of these a sequence of courses has been arranged which enables the student to obtain the professional training essential for entrance into the specialized field. Instruction is directed toward the broader aspects of the business professions rather than detailed drill in various technical processes. The business courses are combined with a sufficient amount of instruction in other fields to afford a well-rounded university education.

Five-year combined courses in the Institute of Technology and the School of Business Administration are available for students preparing for administrative positions in industrial establishments that require technical training in both engineering and business. A student is enabled to obtain degrees in both engineering and business administration on satisfactorily completing one of the five-year curricula as approved by the official advisers of the School of Business Administration and the Institute of Technology. These combined courses are available to students in the various curricula in the Institute of Technology.

A five-year combined program in Pharmacy and Business Administration is available for students who are preparing for administrative positions in pharmaceutical or certain types of chemical plants. This course also affords training for those planning to enter a wholesale or retail pharmacy business.

A seven-year combined curriculum in Business Administration and Law was introduced in the fall of 1938. It is the purpose of this program to afford a training for several types of positions which require a knowledge in both the fields of law and business administration. These positions are found in certain types of law practice which involve appearance before governmental administrative boards and commissions and also in administrative positions in corporations which are subject to governmental regulation.

A limited number of positions are available to students in the junior and the senior years to supplement the university training. Students selected for these positions are employed by accounting firms, department stores, financial institutions, or other business concerns. The terms and period of employment are arranged to meet the needs of individual students by the employing firms that are co-operating with the school. Employment under these conditions affords an excellent opportunity for laboratory experience. The positions available have been selected by the faculty with special consideration as to the educational value of the work. University credit is allowed for work which has been successfully carried under proper supervision.

The degree master of business administration is awarded through the Graduate School to students who have completed certain specified course requirements beyond the Bachelor's degree. Students who have obtained the bachelor of business administration degree here or in another institution of equal standing may satisfy these requirements in one year. Students who have obtained a bachelor of arts degree from a liberal arts college will generally find it necessary to spend two years in completing this requirement.

LIBRARY INSTRUCTION

The Division of Library Instruction with a full year of professional training in librarianship for students of senior standing has a separate organization, but is under the direction of the university librarian and closely affiliated in its work with other departments of the University. Its course is accepted by the College of Science, Literature, and the Arts, the College of Education, and the University College as the senior requirement for graduation. Certain courses will also be credited by the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. Recent changes have been made in the curriculum to meet legislative changes in the certification of school librarians and a course in hospital librarianship, involving six weeks of additional practice or internship in hospital libraries, is offered in the spring quarter.

INDIVIDUAL CURRICULA

In practically all of the colleges, students of mature age and adequate preparation are permitted to pursue, under the direction of the faculty, one or two distinct lines of study.

A student who is unable to find in any of the curricula of the colleges a program of study suited to his special intellectual interests or professional aims may, with the advice and approval of the University College Committee, arrange a course of study best adapted to his needs. Any course offered in the University may be drawn upon in making up such a program. The satisfactory completion of an approved curriculum entitles the student to the degree of bachelor of arts or bachelor of science.

GRADUATE SCHOOL

The Graduate School gathers into a single organization and unites for the purpose of administration all the activities of the University in all its schools and colleges in so far as they relate to advanced instruction offered for the second or higher degrees, namely, master of arts, master of science, master of business administration, electrical engineer, mechanical engineer, civil engineer, chemical engineer, and doctor of philosophy. The privileges of this school are in general open to all who have received Bachelor's degrees from creditable colleges and universities, based on courses substantially equivalent to those at this University.

Graduate work in medicine is maintained jointly by the Medical School and the Mayo Foundation for Medical Education and Research (see special bulletin). The degrees of bachelor of science (or equivalent) and doctor of medicine and one year of intern service in an acceptable hospital are prerequisite for admission to the clinical departments. Properly qualified college graduates may be admitted to the medical laboratory departments (Anatomy, Physiology, Bacteriology, Biophysics, Pharmacology, and Pathology) without the medical degree and internship. A number of fellowships and scholarships are provided for selected students undertaking graduate courses in chosen specialties in medicine. These courses cover a period of three years and lead to the degree of master of science or doctor of philosophy in the various fields.

Graduate work in certain problems related to dentistry is offered to qualified students in the fundamental or laboratory departments mentioned above. Clinical material and opportunities to supplement this research are available from the Dental Clinic, the Medical Dispensary, and the University of Minnesota Hospitals.

UNIVERSITY SUMMER SESSION

The university Summer Session is organized for two terms, one of six weeks and one of five weeks, from June to September, under the authority of the Board of Regents, as a regular part of the University. Courses in the Colleges of Science, Literature, and the Arts, Agriculture, Forestry, and Home Economics, and Education, the Institute of Technology, the Schools of Medicine, Dentistry, and Business Administration, the Institute of Child Welfare, the Division of Library Instruction, and the Departments of Physical Education, with special attention given to graduate work, are offered. These courses are, in the main, regular courses, the same as are offered during the

academic year, but wherever necessary, are adapted to meet the needs of students in the Summer Session. Address your inquiries to the director of the Summer Session, 406 Administration Building, University of Minnesota, Minneapolis, Minnesota.

FORESTRY AND BIOLOGICAL STATION

The Forestry and Biological Station at Itasca Park offers elementary and advanced courses in the fields of biology by various departments in the College of Agriculture, Forestry, and Home Economics, and the College of Science, Literature, and the Arts during the second term of the Summer Session. Instruction consists of field trips and indoor laboratory work. Opportunities are also offered for research and investigation in the midst of rich and highly diversified flora and fauna of the lake region of the state. The same scholastic standards are maintained at the station as on the campus of the University and credit is given for satisfactory work. The courses are open to qualified graduate and undergraduate students. Certain courses are especially designed for the teachers of biological subjects in colleges, high schools, and public schools. Address your inquiries to the acting director of the Forestry and Biological Station, University Farm, St. Paul, Minnesota.

UNIVERSITY EXTENSION

The General Extension Division conducts late afternoon and evening extension classes in the Twin Cities, Duluth, and in some other communities for the benefit of those who are employed during the usual working hours and are, therefore, not able to attend the regular day classes of the University. It also conducts correspondence study courses which are available to anyone no matter where he may live. These classes and correspondence study courses cover a wide range of subjects, representing the offerings of the College of Science, Literature, and the Arts, the College of Education, the Institute of Technology, and the School of Business Administration.

Instruction, by both class and correspondence study methods, is also open to, and employed by, regularly matriculated students as a means of earning credits toward degrees. Extension classes conducted in Minneapolis, St. Paul, or Duluth are classed as residence work; credits earned in them satisfy residence as well as credit requirements. Credits earned by correspondence study do not classify as residence, but are accepted for a part of the credit requirements for most undergraduate degrees. (The Institute of Technology has special requirements which students must follow.) Students, therefore, who are temporarily out of residence (except dropped students) are privileged to register for either form of instruction.

The General Extension Division also provides a number of other educational facilities, such as: lectures by faculty members and others, lyceum courses, popular lectures, concerts and entertainments; it lends lantern slides and films for both entertainment and instruction; it maintains a Municipal Reference Bureau; it holds annual short courses in a number of subjects including a year course for embalmers; it gives advice to schools and other

organizations on the selection and production of plays; and it administers the university radio broadcasting station for educational purposes.

For further information, and for bulletins of extension classes, correspondence study, and lecture courses, address the General Extension Division, 402 Administration Building, University of Minnesota, Minneapolis, Minnesota.

The work of the Agricultural Extension Division is entirely separate from that of the General Extension Division. See Organization of the University, page 48.

PHYSICAL EDUCATION FOR WOMEN

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 women students. The facilities of this department, including the 18-hole golf course, tennis courts, three gymnasia, two swimming pools, squash court, large indoor sports room, outdoor playing fields, are available for use by all women students.

The activity program offers an opportunity for the development and maintenance of physical fitness and vigor and for harmonious posture, carriage, and other daily life skills. It provides an opportunity for the expression of creative ability in rhythm and the dance and for the acquisition of personal and recreational skills.

The Women's Athletic Association, sponsored by the Department of Physical Education for Women, carries on a rich intramural program for women students and affords an opportunity for student service and leadership.

The Department of Physical Education for Women offers professional curricula in the College of Education.

UNIVERSITY LIBRARY

The University Library comprises all the collections of books belonging to the University. It now contains more than 1,030,000 volumes.

The University Library Building, containing not only the general collection but also several important college and departmental collections, houses 800,000 volumes available for use.

In addition to the General Library, branches are maintained in the Department of Agriculture, the Institute of Technology, the Law School, the University High School, and the Department of Geology. Small collections of books constantly in use in departmental work are deposited in many important departments of the University.

The *Library Handbook,* copies of which may be had gratis upon application at the library, contains information essential to the proper use of the library. It should be read carefully by every advanced student. The essential regulations regarding borrowing library books are published each quarter in the Official Daily Bulletin of the *Minnesota Daily.*

SPEECH SERVICE

The Speech Clinic is available to any student in need of remedial treatment for defective speech, such as lisping, dialect, oral inaccuracy, stuttering, or inadequate speech personality. Often it is found that students have difficulty in college adjustments because of inadequacy in left-handed writing, transferred handedness, or mixed hand dominance. Services to these students include clinical and consultant aid. Speech proficiency is essential to adequate success in any profession. Speech defectives have an opportunity of receiving help before graduation.

A laboratory fee of $3 per quarter is charged students carrying 12 hours academic work. These students may spend from 6 to 8 hours a week in the clinic. Students carrying from 6 to 8 hours academic work toward a degree pay $20 per quarter for which they receive 20 hours a week clinical work.

The clinic also has an outpatient department for stutterers. During the regular academic year the cost is $50 per quarter for full-time work. This includes Health Service. Half-time patients pay $30 per quarter. During eight weeks of the Summer Session full-time outpatients pay $65 including Health Service.

University students and outpatients should consult the director of the Speech Clinic, Room 411 Folwell Hall, concerning registration for clinical therapy.

STUDENTS' HEALTH SERVICE

Through the Students' Health Service the University makes available to students medical care, physical examinations, and health consultations. General service is provided free of charge, but for services which are specialized and individual in character, such as dentistry, X ray, board and laundry in the student hospital, outpatient calls, minor surgery, etc., special fees are charged. No student, however, will be denied service because of inability to pay these fees. Major surgical operations or prolonged medical care ordinarily are secured through private physicians selected by the students or their families, but, if necessary, operations may be arranged for through the Students' Health Service upon the established basis.

On the Main campus the offices of the Health Service and the Students' Hospital and Dispensary are located in the Health Service Building. On the University Farm campus the hospital and dispensary also are located in a special Health Service Building. The services of the hospital and dispensary are available at all hours of the day and night. Physicians of the Health Service are in attendance daily. The telephone call for the Health Service on the Main campus is Main 8551; for the one on the University Farm campus, Nestor 4616.

The facilities of the dispensary, medical and dental, are such that a large number of students can be given attention in a day. The normal capacity of the two hospitals is one hundred beds. In emergencies, this capacity can be increased. Ample provisions are made for the isolation of communicable diseases.

The Health Service has been established for the purpose of safeguarding the health of students. Its aims are (1) to help each student entering the University of Minnesota to possess a healthy, vigorous, active, and harmoniously developed body, thereby contributing much to his success while in college and in later life; (2) to reduce to the very minimum the prodigious academic and economic loss due to indisposition and illness of students. Positive health is its goal.

VOCATIONAL INFORMATION

Freshmen who are undecided as to what occupation or profession to choose and what college course to take are encouraged to communicate with the University Testing Bureau, Room 101 Eddy Hall. This bureau is organized for the purpose of assisting students in making vocational decisions. If possible, they and their parents should come to the University during the summer for an interview and a discussion of their problems. During Freshman Week the Committee on Vocational Information will be available for this type of service, but freshmen are urged to seek help prior to Freshman Week. The services of the University Testing Bureau are not intended to duplicate the advice students may receive from the dean of the college in which they plan to enroll; they should therefore seek advice from both agencies. Inquiries should be addressed to the director, University Testing Bureau.

MILITARY SCIENCE AND TACTICS

Courses in military science and tactics are elective. All students electing these courses are given the instruction prescribed for the Basic and Advanced Courses, Coast Artillery Corps, Signal Corps, and Medical Corps, Reserve Officers' Training Corps, and will be 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 only. 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 that they have had the prerequisite advanced algebra and plane trigonometry, or provided that 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. 4 or 6, Trigonometry; 1 and 6 preferred). For those who are planning to take the Advanced Coast Artillery Course, the course in college algebra is recommended (Science, Literature, and the Arts, Math. 7, College Algebra, or Math. 8, Commerce Algebra).

ADVANCED COURSES

Subject to the recommendation of the professor of military science and tactics and the approval of the president of the University, any student is eligible for enrolment who has completed the Basic Course, Senior Division, R.O.T.C., or other equivalent military work. The course consists of six quarters of five hours of classroom work per week, for which three credits per quarter are offered.

Students enrolled in the Advanced Course are furnished a uniform and receive from the Federal Government a fixed sum of pay per day while pursuing this course. They are required to enter into an agreement to continue in the course during their time at the University until completion and to attend such summer training camps as are 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 the 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 reserve officers in the Army of the United States in the lowest grade of the branch of service to which they are assigned.

ADMISSIONS

GENERAL

All matters relating to admission to the University and to credit for work at other schools and colleges are handled by the University Board of Admissions. The registrar is the secretary of this board. All credits, applications for admission, and inquiries about admission should be addressed to the Registrar, University of Minnesota, Minneapolis, Minnesota.

APPLICATIONS FOR 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 registrar 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 registrar of the University.

The applicant for admission from another college may send the information on pages 1 and 2 direct to the registrar and, in addition, he 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 registrar who will issue an authorization for the entrance examination.

Nonresidents of Minnesota are required to submit also the information called for on the "Supplementary Application for Nonresident Undergraduate Applicants." See pages 38-39 for a statement of the University's policy governing the admission of nonresident undergraduates.

ADMISSION FROM HIGH SCHOOL

Admission to the freshman class is either by examination (see page 36) or by certificate.

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.

The public and private high schools on the Minnesota accredited list will be found on pages 51-60.

In addition to being a graduate of an accredited school, the applicant must meet certain requirements set up by the University.

In order to understand the statement of these requirements the following definitions are given:

A "unit" of high school work means not less than five recitations of forty minutes each week for a school year of thirty-six weeks. In such subjects as shop, drawing, cooking, typewriting, and similar courses,

a "unit" means the equivalent of ten recitation periods a week for thirty-six weeks. Double laboratory periods will not be required from schools organized on a sixty-minute class period schedule.

"Admission group" refers to the special grouping of the high school subjects as they appear below.

A "major" means at least three units in one admission group.

A "minor" means at least two units in one admission group.

The admission groups and the minimum and the maximum number of units in any one subject that will be accepted for admission are as follows:

Group A: English.—Composition and literature, one to three units. Not to exceed one unit of public speaking, or journalism may be presented in partial satisfaction of these requirements.

Group B: Foreign languages.—Requirements for a major in this group, three units in one language; for a minor, two units in one language.
French, one to four units
German, one to four units
Greek, one to four units
Latin, one to four units
Scandinavian languages, one to four units
Spanish, one to four units

Group C: History and social sciences.—Requirements for a major in this group include at least two units in history; for a minor, at least one unit in history.
History—
American, one-half or one unit
English, one-half or one unit
European, one or two units
Social sciences—
American government, one-half or one unit
Commercial geography, one-half or one unit
Elementary economics, one-half unit
History of commerce, one-half or one unit
Sociology, one-half or one unit

Group D: Mathematics
Elementary algebra, one unit
Higher algebra, one-half or one unit
Plane geometry, one unit
Solid geometry, one-half unit
Trigonometry, one-half unit
Unified mathematics, two units

Group E: Natural sciences.—For a major or minor in this group, not more than two half-unit courses may be included.
Astronomy, one-half unit
Biology, one unit
Botany, one-half or one unit
Chemistry, one unit
Geology, one-half unit
Physics, one unit
Physiography, one-half or one unit
Physiology, one-half unit
Zoology, one-half or one unit

Group F: Vocational and miscellaneous subjects, one-half to three units. In this group there may be included any subjects not specifically listed in Groups A, B, C, D, or E which have been accepted by the high school toward its diploma.

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).

SPECIAL REQUIREMENTS OF THE INDIVIDUAL COLLEGES

Applicants entering by the examination method (page 36) are not required to meet these special group requirements.

College	Minimum No. Units Groups A to E inclusive	Major in Group	Major or Minor in Group	Major or Minor in Group	Specific Subjects Required	Special Requirements and Recommendations. *See* below
Science, Literature, and the Arts	9*	A	D	Elective	None	1
Institute of Technology	9*	Elective	D	A	None	2
Agriculture, Forestry, and Home Economics: Forestry and Agricultural Science courses	9* or 8†	Elective	D	A	E. 1 unit	3
All other courses	9* or 8†	Elective	A	Elective	None	
Nursing	9*	A	D	Elective	None	4
Dental Hygienists	9*	Elective	A	Elective	None	
Pharmacy	9*	A	D	Elective	Physics, 1 unit	5
Education: Music Education	9*	A	D	Elective	None	
Other courses except those requiring pre-education work	9*	A	Elective	Elective	None	

Admission to the other schools and colleges of the University requires two or more years of preprofessional work. Except as indicated on page 37, this preprofessional work is offered in the College of Science, Literature, and the Arts, and the requirements for admission to that college should be met.

* 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.

† An applicant for Agriculture or Home Economics curricula will be admitted with only 8 units in Groups A to E inclusive provided he presents one unit of senior high school Agriculture or Home Economics respectively from Group F.

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 a 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 nor as part of the nine units required to be presented from Groups A to E inclusive.

RECOMMENDATIONS OF THE COLLEGES

The numbers of the following paragraphs refer to the numbers appearing in the last column of the table of special college requirements above.

1. *The College of Science, Literature, and the Arts.*—Applicants for admission to this college must give evidence by their record in high school and

by their standing in the college aptitude tests that they are prepared to take advantage of the educational opportunities offered by work in this college.

2. *Institute of Technology.*—Applicants who stand in the upper 60 per cent of their high school class on the basis of scholarship will be admitted directly. Others will be given individual consideration and may be permitted to take special tests to qualify for admission.

All students entering the institute are urged to include in their high school courses: additional mathematics, including both higher algebra and solid geometry; English, three units; chemistry; physics; Latin, two units; German or French, two units; 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.

Students entering without higher algebra or solid geometry or both must register for such courses in the fall quarter without credit. 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.

3. *College of Agriculture, Forestry, and Home Economics.*—A student entering Agriculture or Home Economics will be permitted a minimum of eight standard units (Groups A to E inclusive) for entrance in case the applicant presents one unit of senior high school agriculture or home economics respectively.

Students entering with a unit of high school chemistry are permitted to take a two-quarter course of five credits each in general chemistry in college instead of a three-quarter course of four credits each. Students presenting a unit of high school physics are not required to take an elementary course in college physics.

Every prospective student in agricultural curricula is urged to obtain at least six months practical experience on a farm before entering college. Those whose farm experience credentials are not satisfactory will be examined as to their familiarity with farm practices and farm experience, or such experience as the committee may consider equivalent will be required during the college course in accordance with the results of these examinations. The State Department of Education requires that before certification a candidate for an agricultural high school teacher "must have had at least two full years of farm experience after the age of sixteen or he shall have been born and reared on a farm until the age of sixteen." It is also recommended that major and minors be taken in Groups A, D, and E.

For all students intending to enter any course in forestry it is recommended that major and minors be taken in Groups A, D, and E.

Students in Forestry and Agriculture who have completed higher algebra in the high school will be exempt from Mathematics 1 provided they pass the placement test given by the Department of Mathematics which requires the equivalent of Math. 1, Higher Algebra.

Students who have completed higher algebra and trigonometry in high school will be exempt without placement tests from the freshman mathematics requirements of the college when these include not more than higher algebra and trigonometry.

Students in forestry and wildlife management are urged to complete both higher algebra and trigonometry in high school.

For students entering any of the fields of the college, viz., agriculture, forestry, and home economics, success and experience in high school mathematics and science are valuable assets.

4. *School of Nursing.*—Applicants must be not less than eighteen nor more than thirty-five years of age upon beginning their clinical practice. They must submit satisfactory evidence of physical and mental fitness and of good character and pass a satisfactory general physical examination by the University Health Service. Final selection is made on the basis of scholarship, character, and general fitness.

5. *College of Pharmacy.*—One unit of high school physics, or its equivalent, is prerequisite to the professional subjects of the sophomore year in the College of Pharmacy. Therefore, high school students are urged to include this subject as part of their high school course. Students entering the College of Pharmacy with advanced standing must meet the physics requirement. Their individual cases will be considered by the Students' Work Committee.

Students who have met the one unit of high school physics requirement, are referred to the first year of outline of four-year course. Those who have not met the entrance requirement of one unit of high school physics may register in the College of Pharmacy but must complete College Physics 1, 2, and 3 (total 12 credits) before they will be permitted to register for sophomore subjects in this college. (See Combined Class Schedule.) Credits earned in college physics will satisfy the entrance requirement of one unit of high school physics. They may also be applied toward the required 21 credits of academic electives of the first year.

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 state high school board certificates from examining boards of other states;
2. By presenting certificates representing examinations given by the College Entrance Board; or
3. 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 he wishes to enter.

They may be taken also by any individual who is not a high school graduate provided he 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.

In order to take the tests at the University, the official application blank should be filed with the registrar according to the instructions on page 32. 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 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.

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. For admission to some of the colleges additional placement tests are required as follows:

Institute of Technology	Mathematics (including arithmetic, elementary algebra, and plane geometry) and chemistry Physics or chemistry
Agriculture, Forestry, and Home Economics	General Science and Mathematics
College of Pharmacy	Physics (see special requirements and recommendations 5, page 36)
Music Education (College of Education)	Mathematics and music
Art Education (College of Education)	Art
Nursing	Nursing Aptitude

ADMISSION TO SENIOR PROFESSIONAL SCHOOLS

Admission to the schools and colleges listed below requires two or more years of preprofessional work as indicated, either at the University of Minnesota or at some other recognized college or university. The bulletin of the college concerned should be obtained from the registrar and consulted for the specific preprofessional requirements. On entering the University for the preprofessional work, the applicant must meet the admission requirements of the college in which the preprofessional work is to be taken. (See Courses and Degrees, pages 10-31.)

Institute of Technology, Course in Interior Architecture	Two years in Science, Literature, and the Arts
Law School	Two years in Science, Literature, and the Arts
Medical School	Three or more years in Science, Literature, and the Arts
School of Dentistry	Two years in Science, Literature, and the Arts

College of Education	Two years in Science, Literature, and the Arts; or in Agriculture, or in Home Economics; or in the General College; or five quarters in Science, Literature, and the Arts and ten quarters in the School of Nursing. Exceptions are the special four-year courses of study in Art Education, Industrial Education, Music Education, Physical Education, and School Health Work.
School of Business Administration	Two years in Science, Literature, and the Arts; Agriculture, Forestry, and Home Economics; or the Institute of Technology

ADMISSION TO ADVANCED STANDING

This University accepts credits from other colleges and universities toward the University's degrees. Such credits are accepted as far as they represent courses equivalent to those offered in the University of Minnesota. The certified record of courses taken in other institutions must be upon the official transcript blank of the institution granting the certificate and should be accompanied by a letter or statement of honorable dismissal.

Applications for advanced standing should be made, if possible, at least one month before the time when the student expects to enter the University and on the official application blank, copies of which may be obtained from the registrar's office, University of Minnesota.

All statements concerning advanced standing and classification are provisional, subject to the satisfactory completion of one year's work at the University.

Candidates wishing to gain advanced standing by examination are allowed examinations without charge, provided they are taken within six weeks after admission.

See page 61 for a list of institutions in Minnesota that are recognized for advanced standing credit.

ADULT SPECIAL STUDENTS

Persons of mature age (twenty-four years or older) and experience who may desire a special and limited course of study may be admitted to any of the colleges of the University.

Such applicants must submit the information called for on the regular application blank, and must obtain the recommendation of the dean of the college concerned and the approval of the Board of Admissions.

An adult special student may not be a candidate for a degree without meeting the admission requirements in a way satisfactory to the Board of Admissions.

GENERAL POLICY GOVERNING ADMISSION OF NONRESIDENT UNDERGRADUATES

The increasing registration at the University of Minnesota, and the prospect that it will continue for approximately ten years, and the decreasing income per student have made it necessary for the regents to survey the situation to determine what constructive steps should be taken to insure effective scholastic work at the institution.

Altho a number of suggestions have been considered, only one has been acted upon, and it relates to nonresident students. The regents are of the opinion that the University should not become local and provincial. They welcome and wish to encourage students from foreign countries, the children of alumni and former students residing in other sections of the United States or the world, students from the Northwest and from neighboring states, and a reasonable number of nonresident students from every part of the United States. The regents know that the number of nonresident students at the University in the past has been approximately equal to the number of residents of Minnesota in attendance at universities in neighboring states. But of late there has been a tendency for the number of nonresidents at Minnesota to increase more rapidly than the number of residents attending universities in other states. The regents believe that a balance should be maintained in this matter. It is their opinion that the time has come when the University of Minnesota should exercise discretion with regard to the number of nonresident students it admits. Students from outside Minnesota whose secondary school work, intelligence rating, or other measures of scholastic achievement do not give better than average promise of an ability to profit from courses of instruction and residence at the University of Minnesota should not be admitted.

A study of the fees paid by nonresident students at other institutions makes it apparent that larger nonresident fees should be charged at the University of Minnesota.

Looking toward the above adjustment between nonresident students and resident students, the regents have directed:

1. That beginning with the academic year, 1937-38, discretion shall be exercised in the admission of nonresident undergraduate students.
2. That tuition fees be increased for undergraduate nonresident students as shown on page 52.

APPLICATION PROCEDURE

To be considered for admission an applicant must file *not later than six weeks* prior to the opening of the quarter for which admission is requested:

1. The formal application blanks completely filled out.
2. The supplementary application for nonresidents of Minnesota.
3. High school record.
4. College record and honorable dismissal (if the applicant has attended college).
5. Results of such tests as may be specified by the Board of Admissions on receipt of the application blank.

The final dates for filing such material for 1939-40 are:

Fall quarter	August 14, 1939
Winter quarter	November 23, 1939
Spring quarter	February 10, 1940
Summer Session: first term	April 27, 1940
Summer Session: second term	June 8, 1940

Selections will be made and applicants will be notified as soon as possible following these dates.

CREDENTIAL EXAMINATION FEE

Each application for admission to a senior professional school or college from a nonresident of Minnesota shall be accompanied by a $5 credential examination fee. (The senior professional schools are the Medical School, School of Dentistry, Law School, College of Education except courses admitting freshmen, and the School of Business Administration.)

This fee is not refundable, but if the applicant enrolls within one year following the date of application, the $5 payment will be credited to his tuition for the first quarter.

Remittance should be in the form of check, bank draft, or money order, payable to the University of Minnesota. *Do not send cash.*

EXPENSES

For detailed statement of university fees and basis for refunds, see pages 52-56.

The following table estimates the expenses of the average first year. The columns give estimates for the different colleges. This estimate does not include expenses for clothing, railroad fare, vacations, and amusements.

ESTIMATED EXPENSES OF THE ORDINARY STUDENT DURING HIS FIRST YEAR IN COLLEGE

	Academ., Agric., For., H.E., Educ., Gen., Grad.	Bus. Adm.	Law	Inst. of Tech.	Dent.	Dent. Hyg.	Med.	Pharmacy
Incidental fee	$ 24.00	$ 24.00	$ 24.00	$ 25.20	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Matriculation fee	15.00§	15.00	15.00	15.00	15.00	5.00	15.00	15.00
Course and lab. fees	6.00	6.00	6.00	6.00	3.00	9.00	6.00	6.00
Laundry	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Room rent	112.50	112.50	112.50	112.50	112.50	112.50	112.50	112.50
Board	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00
¶Tuition	60.00	90.00	120.00	90.00	180.00	75.00	225.00	105.00
Books and instruments	35.00	35.00	45.00	40.00	218.00*	33.00†	180.00‡	35.00
Total	$542.50	$572.50	$612.50	$578.70	$842.50	$548.50	$852.50	$587.50

* Of this amount $170 is for instruments.

† Of this amount $18 is for instruments.

‡ Of this amount $135 is for a microscope.

§ Matriculation deposit for the Graduate School is $3.

¶ This is the tuition charge for a resident of the state of Minnesota. For additional charges for nonresident tuition see nonresident fees, page 52.

For women the matriculation fee is $5 in place of $15. There is a difference of from $5 to $25 ($50 in the Medical School) between resident and nonresident tuition.

Tuition, incidental, and course fees are payable quarterly in advance and must be paid promptly to avoid late fees. These payments are due in September, December, and March—the final dates for payment will be found in the university calendar, pages 50-51.

The matriculation deposit fee is payable on first registration. Additional deposits may be required at any time that the balance is deemed insufficient. The balance will be refunded on graduation or when the student leaves the institution.

By obtaining cheaper board and room many students will be able to live for less than the amount estimated in the above table. Likewise, other students will pay more for board, room, and incidentals, and will not be able to live for the amounts estimated. To live within the minimum amount a student must forego all luxuries and economize in every way possible. For students living at home several items in the above table will have to be modified.

BOARD AND ROOM

GENERAL REGULATIONS

1. It is understood that a room is engaged for a complete quarter, unless otherwise arranged with the householder. Only when a student withdraws from the University is such student released from payment.

2. It is understood that a room is automatically released at the conclusion of each quarter, but ten days' notice must be given to householder. Men are also required to notify the office of the dean of student affairs.

3. A $5 deposit is made to a householder when a room is engaged.

4. It is advisable to make separate arrangements for board and room.

5. Students are advised—when possible—to board where they room.

6. No rebate in room rent is allowed for absence.

7. Rebate in charges for board is made only if absence exceeds a week, or if arrangements have been made in advance with the householder. This rule applies to absence during vacations as well as to all other absences.

8. A special charge is made for meals served to guests, or for extra services to guests.

WOMEN

Sanford Hall, the residence hall for university women, is situated at 1100 University Avenue, S.E., two blocks from the main entrance to the campus. It is of brick construction and is practically fireproof. The two wings of which it is composed are connected on the first floor by a large dining room in which all meals are served "family fashion." Each wing has a good-sized, attractively furnished living room, and a smaller reception room. A small music room is located in the east wing, while in the west wing there is a library and a reading room well equipped with the latest magazines, books, and daily papers. These are for the use of all residents.

The hall accommodates 245 women, and provides both single and double rooms. Each room is supplied with running hot and cold water, and the entire building is generously equipped with bathrooms. Rooms are furnished with a bed, dresser, study table, rugs, chair, clothes closet, and one pair of blankets for each resident. Bed linen is also furnished and laundered.

A director, an assistant director, four graduate counselors, and the House Council are responsible for the social life of the students, and a social program, planned to meet the needs of all types of girls, is successfully carried out each quarter. A chorus and orchestra and music appreciation group under the direction of the music counselor, is a popular part of the program. A series of clubs, including drama, bridge, and other interests is supervised by the interests counselor. A scholarship and tutor counselor assists any girls who are having difficulties with their studies, and the hall maintains a satisfactorily high scholastic average. A resident nurse is on call whenever needed.

All applications for residence must be made for the entire school year. It is best to apply as early as possible. Applications will be considered in the order in which they are received, with preference given to Minnesota residents and daughters of Minnesota graduates.

Communication requesting residence or regarding prices or any other details should be addressed to the house director, Sanford Hall.

Co-operative cottages.—Nine co-operative cottages, each in charge of a chaperon, offer comfortable homes for about one hundred-fifteen women. By assisting with the work of the houses, the students are able to keep expenses under $25 a month. In assigning students to these cottages preference is given to women earning a part of their expenses. It is understood that students engage rooms for the school year and will not be released until their places can be filled.

Application may be made to the manager of university cottages, Shevlin Hall.

College Girls' Dormitory, University Farm.—A dormitory residence for girls in the College of Agriculture, Forestry, and Home Economics is located on the University Farm campus. About fifty students may be accommodated. The dormitory is closed during vacations.

The charge per quarter is $30 for a single room and $24 per student for a double room. The number of single rooms is limited. Meals are not served at the dormitory, but can be obtained at the University Farm cafeteria at reasonable rates.

Necessary bedding is provided and the bed linen laundered. Girls should provide their own couch covers.

All applications for residence must be for the entire school year. A deposit of $5 is made when the room is engaged. Room rent is payable the first week of each quarter. Communications regarding reservations or further information should be addressed to Superintendent's Office, School of Agriculture, University Farm, St. Paul, Minnesota.

Rooming houses.—Attention is called to the ruling of the Board of Regents that students are not allowed to reside in any house which is not on the approved list:

> Students, whether graduate or undergraduate, while attending the University must have their places of residence approved by the proper authorities of the University. If, in the opinion of the Board of Regents or its representatives, the conditions at any such place are not conducive to study, health, or morals, it may, at its discretion, insist that students vacate such residence and occupy rooms that are approved by the Board.

However, special arrangements may be made with the dean of women and the dean of student affairs.

All students should bring at least three sheets, two pillow cases, and towels, all to be marked with the full name of the owner. No electric light stronger than fifty watts is required in a student's room. No electric appliances are to be used except by permission of the householder. Double rooms rent for from $12 to $15 a month for each student and single rooms for from $15 to $20 a month. Board at the present time is from $6 to $7 a week for two meals per day.

For further information and lists of addresses, application may be made to the director of the Housing Bureau, Shevlin Hall.

Shevlin lunch room.—Light lunches including sandwiches and one hot dish are served at noon. A large dining room with tables is available for university and high school students who carry their lunches.

School of Nursing expenses.—Students in the five-year nursing course are registered in the academic college during the first five and last three quarters of the course and have the same expenses in regard to maintenance, tuition, etc., as other students in that college. Estimate of expenses during the time they are in the School of Nursing is as follows:

Payable at the time of registration	
Tuition and deposit	$36
Books	15
Payable during the first quarter	
Room and board	80–115
Payable at the end of the first month	
Uniform cape and initial set of uniforms	55
Payable during remainder of first year	
Books	15
Miscellaneous	5
Payable during junior year	
Books	10
Miscellaneous	10
Payable during senior year	
Books	10
Miscellaneous	20
Graduation fee	7.50
	$263.50 to $298.50

Room and board are furnished by the associated hospitals without charge to the student except as indicated above. Students in the School of Nursing receive no salary and have no opportunity for earning money while in training. After the first year they are eligible to apply for aid from the student loan funds. The above estimate does not include clothing, incidentals, railroad fare, nor provisions for the vacation periods.

Expenses of students in the three-year nursing course are similar to those of the five-year group during the latter's enrolment in the School of Nursing.

Postgraduate students receive maintenance during the major portion of their courses. For details of expense see the School of Nursing Bulletin, which may be had from the registrar.

MEN

Pioneer Hall, the residence for men at the University of Minnesota, provides a comfortable and up-to-date home for college men. It has been built and equipped to provide the most desirable residence advantages at very moderate cost.

An attractive colonial structure, capable of housing 535 persons, Pioneer Hall overlooks the Mississippi River at a point two blocks from the campus and is easily accessible by street car and bus from the downtown districts, both of Minneapolis and St. Paul. The building, which is fireproof, is arranged in two units of eight houses, each unit forming a quadrangle. Each house has a separate entrance and offers accommodations for approximately thirty-two students.

Much of the loneliness and homesickness that exists among students is quickly dispelled by the sociability and comradeship which ensue from con-

tacts with fellow students around the dining room tables and in social and athletic activities.

Most of the rooms are arranged in three-room suites for two students, a suite consisting of a separate bedroom for each student and a common study. Some single and a few double rooms also are provided for students who prefer such arrangements. The rooms are furnished in a comfortable and convenient manner, students being supplied with a combination wardrobe and dresser, bed, chair, study table, arm chair, rug, wastebasket, bed linen, and bed cover. Students should furnish blankets, study lamps, towels, and other personal necessities. Maid service is provided.

Pioneer Hall offers many advantages in the way of recreation facilities. In addition to its well-furnished and comfortable lounges, facilities for golf driving, shuffleboard, handball, pool, billiards, table tennis, chess, and checkers are to be found in its game rooms. Also, a very modern soda fountain has been installed for the convenience of its residents.

Students interested in residence in the hall should write to the director of Pioneer Hall, University of Minnesota, for a copy of the special bulletin and an application form. Assignments will be made in the order of application.

Approved boarding and rooming houses.—A list of approved boarding and rooming houses may be secured at the Housing Bureau. Good double rooms for two men can be obtained within easy walking distance of the campus for from $20 to $25 per month. Good single rooms rent for from $15 to $20 per month. Board at the present time varies from $6 to $7 per week for two meals per day.

Minnesota Union.—At the Minnesota Union, the men's clubhouse on the campus, breakfast and luncheon are served daily on the cafeteria plan. Several private dining rooms accommodating both small and large groups are available for luncheons and banquets.

AIDS FOR STUDENTS

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, and loan funds, and the Employment Bureau.

The University has no scholarships to offer new freshman students. For full information concerning these "aids" write to the registrar for the bulletin University Aids for Student Expenses. Information may be obtained also from the dean of the college in which the student is registered, the head of the department particularly concerned, the registrar, the dean of student affairs, or the dean of women. In general, all applications for loans should be made to the dean of student affairs and all applications for scholarships for women should be made to the dean of women. No student is eligible to borrow from any university loan fund until he has completed two quarters' work at the University of Minnesota.

The University also offers students aid in their curriculum through the

medium of the college advisers. The offices of the dean of student affairs and the dean of women offer guidance in all kinds of personal problems. The University Testing Bureau is designed to assist students in the field of vocational guidance. The University Health Service and the university psychiatrists are other mediums of assistance open to the university student. This is not all inclusive as there are other agencies on the campus making their facilities available to students at all times.

INTERCAMPUS CAR

Students and faculty who have classes on both campuses are entitled to free transportation on this line. Passes are issued to students on the University Farm campus at the registrar's office on the University Farm campus, and at the university post office for students registered on the Main campus.

Students who are registered for classes on the Minneapolis campus and who live in the College of Agriculture dormitories will also be given free transportation. These passes will be issued at the registrar's office on the University Farm campus.

Tickets for the intercampus car may be purchased at the cashier's office on either campus by staff members, students, employees, or members of their families.

UNIVERSITY EMPLOYMENT BUREAU

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. This bureau co-operates with all other student personnel services in order to help students to balance both jobs for support and time for classes and study, so that neither the education, health, nor the work will suffer.

The University, itself, offers a certain amount of opportunity for employment in its several instructional and service departments.

To those who are without support of any kind it may be said that many students, with the aid of the money saved from summer employment, are making all of their college expenses. A few are able to make their expenses during the college year, but this can be done only by students of unusual force and adaptability, or with exceptional opportunities. The majority of self-supporting students must meet stern competition; must live economically; must guard their health while preserving a fair balance between time given to studies and to outside work.

It is not a good policy to begin life in a new community entirely without resources. In addition to tuition fees prospective students should have at least $150 or the equivalent; and then it will be necessary for them to live very economically.

While it must be remembered that there are always more applicants than positions, the Twin Cities, nevertheless, offer many opportunities to the self-supporting student. Students are employed as clerks, stenographers, bookkeepers, cashiers, store clerks, drug clerks, salesmen, solicitors, tele-

phone operators, translators, tutors, mechanics, musicians, waitresses and waiters, domestic workers, laborers, janitors, and in many other capacities, some of which are highly specialized. However, a student, especially one who is new and unacquainted, may not be able to place himself or get the work he would prefer at first.

While every effort is made to secure work for all who need it, the positions that come to the bureau cannot be assigned in the order in which the applications are made. The places open are so varied that it would be impossible to assign them in order, without regard to the ability and qualifications of different applicants. The employer must be given the best person for his particular job. Fitness must be the first consideration.

Applicants should also know that during the opening week of school hundreds of students apply to the Employment Bureau for work. It is manifestly impossible to place all of these students as soon as they apply and some students have to wait for days or weeks before they can secure work. The amount of work available varies with employment conditions.

It is usually not advisable for a student to make a sacrifice to come to the city before the opening of the school year in the hope that he can get a position before the other students arrive, because much of the work for self-supporting students is created by the presence of the other students on the campus. Therefore, until the other students are here there are very few part-time jobs available.

Those who find themselves without funds at the beginning of the college year can register in some of the evening extension classes and seek employment during the day rather than run the risk of not being able to finance themselves while carrying regular university work. By choosing extension courses for which university credit is allowed, students can make their future university work much easier and give themselves more time for outside work.

The correspondence study courses offered by the General Extension Division are open to all. Students who can meet the usual requirements for college entrance are allowed university credit for most of these courses.

The University Employment Bureau is not equipped to find full-time employment for extension and correspondence study students.

APPENDIX

ORGANIZATION OF THE UNIVERSITY

The University is organized in schools, colleges, and divisions as follows:

GENERAL COLLEGE

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

INSTITUTE OF TECHNOLOGY, including—
- COLLEGE OF ENGINEERING AND ARCHITECTURE, including—
  - ENGINEERING EXPERIMENT STATION
- SCHOOL OF MINES AND METALLURGY, including—
  - MINES EXPERIMENT STATION
- SCHOOL OF CHEMISTRY

DEPARTMENT OF AGRICULTURE, including—
- COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS
- SCHOOLS OF AGRICULTURE, including—
  - CENTRAL SCHOOL, UNIVERSITY FARM
  - NORTHWEST SCHOOL, CROOKSTON
  - WEST CENTRAL SCHOOL, MORRIS
  - NORTH CENTRAL SCHOOL, GRAND RAPIDS
- AGRICULTURAL EXPERIMENT STATIONS, including—
  - STATE EXPERIMENT STATION, UNIVERSITY FARM
  - NORTHWEST EXPERIMENT STATION, CROOKSTON
  - WEST CENTRAL EXPERIMENT STATION, MORRIS
  - NORTH CENTRAL EXPERIMENT STATION, GRAND RAPIDS
  - NORTHEAST DEMONSTRATION FARM AND EXPERIMENT STATION, DULUTH
  - SOUTHEAST DEMONSTRATION FARM AND EXPERIMENT STATION, WASECA
  - FRUIT BREEDING FARM, EXCELSIOR
  - FOREST EXPERIMENT STATIONS, ITASCA AND CLOQUET
- AGRICULTURAL EXTENSION DIVISION
- SHORT COURSES IN AGRICULTURE

LAW SCHOOL

MEDICAL SCHOOL, including—
- MEDICAL TECHNOLOGISTS
- SCHOOL OF NURSING

SCHOOL OF DENTISTRY, including—
- SCHOOL FOR DENTAL HYGIENISTS

COLLEGE OF PHARMACY

COLLEGE OF EDUCATION, including—
- UNIVERSITY HIGH SCHOOL

GRADUATE SCHOOL, including—
- MAYO FOUNDATION

SCHOOL OF BUSINESS ADMINISTRATION

UNIVERSITY EXTENSION SERIVCE, including—
- GENERAL EXTENSION DIVISION
- AGRICULTURAL EXTENSION DIVISION

CENTER FOR CONTINUATION STUDY

BOARD OF REGENTS

The Hon. James F. Bell, Minneapolis	1945
The Hon. Daniel C. Gainey, Owatonna	1943
The Hon. Richard L. Griggs, Duluth	1945
The Hon. George W. Lawson, St. Paul	1945
The Hon. W. J. Mayo, Rochester	1941
The Hon. E. E. Novak, New Prague	1943
The Hon. A. J. Olson, Renville	1943
The Hon. Albert Pfaender, New Ulm	1941
The Hon. Ray J. Quinlivan, St. Cloud	1945
The Hon. F. J. Rogstad, Detroit Lakes	1943
The Hon. Fred B. Snyder, Minneapolis	1941
The Hon. Sheldon V. Wood, Minneapolis	1941

ADMINISTRATIVE OFFICERS

Guy Stanton Ford, Ph.D., LL.D., Litt.D., President
Malcolm M. Willey, Ph.D., Assistant to the President and University Dean
Rodney M. West, B.A., Registrar
William T. Middlebrook, B.A., M.C.S., Comptroller
Frank K. Walter, M.A., M.L.S., Librarian
Ruth E. Boynton, M.S., M.D., Director of the Students' Health Service
Malcolm S. MacLean, Ph.D., Director of the General College
John T. Tate, Ph.D., Dean of the College of Science, Literature, and the Arts
Samuel C. Lind, Ph.D., D.Sc., Dean of the Institute of Technology
Ora M. Leland, B.S., C.E., Dean of Administration, Institute of Technology
Walter C. Coffey, M.S., LL.D., Dean and Director of the Department of Agriculture
Edward M. Freeman, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics
Everett Fraser, B.A., LL.B., Dean of the Law School
Harold S. Diehl, M.A., M.D., D.Sc., Dean of Medical Sciences
William F. Lasby, D.D.S., F.A.C.D., Dean of the School of Dentistry
Charles H. Rogers, Ph.C., D.Sc., Dean of the College of Pharmacy
Wesley E. Peik, Ph.D., Dean of the College of Education
Wilford S. Miller, Ph.D., Acting Dean of the Graduate School
Russell A. Stevenson, Ph.D., Dean of the School of Business Administration
Richard R. Price, M.A., Ed.D., Director of University Extension
Julius M. Nolte, B.A., LL.B., Director of Center for Continuation Study
Anne D. Blitz, M.A., LL.D., Dean of Women
Edward E. Nicholson, M.A., Dean of Student Affairs
Ernest B. Pierce, B.A., Field Secretary of the University and Secretary of the General Alumni Association
Thomas A. H. Teeter, B.S.(C.E.), Director of Summer Session

UNIVERSITY CALENDAR

1939-40

Fall Quarter

1939			
September	18	Monday	Extension registration first semester begins
September	21	Thursday	Payment of fees closes, except for new students[1]
September	25	Monday	Entrance tests
September	25-26		Registration for Freshman Week for all new students entering the freshman class
September	25-29		Examinations for removal of conditions Physical examinations Registration period,[2] College of Science, Literature, and the Arts
September	27-30		Freshman Week
September	28-29		Registration days[2] for all colleges not included above
October	2	Monday	Fall quarter classes begin 8:30 a.m.[3] First semester extension classes begin[4]
October	7	Saturday	Last day for extension registration without penalty
October	19	Thursday	Senate meeting, 4:30 p.m.
October	21	Saturday	Homecoming Day
November	11	Saturday	Armistice Day; a holiday
November	25	Saturday	Dad's Day
November	30	Thursday	Thanksgiving Day; a holiday
December	15-16 and 18-21		Final examination period
December	21	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends, 6:00 p.m.[5]

Winter Quarter

December	28	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1940			
January	2	Tuesday	Entrance tests
January	2-3		Registration[2] for new students in all colleges
January	4	Thursday	Winter quarter classes begin 8:30 a.m.[3]
January	22	Monday	Extension registration second semester begins
February	3	Saturday	First semester extension classes close
February	5	Monday	Second semester extension classes begin[4]
February	10	Saturday	Last day for extension registration without penalty

February	12	Monday	Lincoln's Birthday; a holiday (except for extension)
February	15	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Thursday	Washington's Birthday; a holiday (except for extension)
March 15-16 and 18-21			Final examination period
March	21	Thursday	Commencement Convocation Payment of fees closes for all students[1] in residence winter quarter Winter quarter ends, 6:00 p.m.

Spring Quarter

March	29	Friday	Entrance tests
March	29-30		Registration[2] for new students in all colleges
April	1	Monday	Spring quarter classes begin, 8:30 a.m.[3]
May	11	Saturday	Mother's Day
May	16	Thursday	Cap and Gown Day Convocation Senate meeting, 4:30 p.m.
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Second semester extension classes close
June 7-8 and 10-14			Final examination period
June	9	Sunday	Baccalaureate service
June	14	Friday	Spring quarter ends, 6:00 p.m.
June	15	Saturday	Sixty-eighth annual commencement

Summer Session

June	17-18		Registration, first term
June	19	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Thursday	Independence Day; a holiday
July	25	Thursday	Commencement Convocation
July	26	Friday	First term closes
July	29	Monday	Registration and payment of fees for second term close Second term classes begin 8:00 a.m.
August	30	Friday	Second term closes

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also late fees for late registration, page 55. 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.

[3] First hour classes begin at 8:15 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes continue to Saturday, December 23, and will resume Tuesday, January 2, 1940.

UNIVERSITY FEES

The university year, extending from October to June, is divided into three terms called quarters. On the specified dates (see Calendar, pp. 50-51) 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 Late Fees (page 55) 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.

TUITION FEES

School or College	Quarter Fee		Credit Hour Fee*	
	Resident	Nonresident	Resident	Nonresident
General College	$20.00	$40.00	§	§
College of Science, Literature, and the Arts	20.00	40.00	$1.75	$3.50
Institute of Technology, including Engineering, Architecture, Chemistry, and Mines and Metallurgy	30.00	45.00	2.50	4.00
College of Agriculture, Forestry, and Home Economics	20.00	40.00	1.50	3.00
Law School	40.00	65.00	3.75	6.25
Medical School	75.00	125.00	†3.25	†5.75
School of Nursing (preliminary course)	25.00	40.00	†1.00	†1.75
Medical Technologists	30.00	45.00	†1.25	†2.00
Public Health Nursing	20.00	40.00	1.75	3.50
School of Dentistry	60.00	80.00	†2.50	†3.50
Dental Hygienists	25.00	40.00	2.00	3.25
College of Pharmacy	35.00	50.00	¶1.50	¶2.25
College of Education	20.00	40.00	1.75	3.50
Graduate School	‡20.00	‡40.00	‡1.75	‡3.50
Clinical Medicine	75.00	125.00	†3.25	†5.75
School of Business Administration	30.00	45.00	2.75	4.25
Division of Library Instruction	40.00	50.00	3.00	3.50

* Students carrying less than the complete schedule of work pay fees on a credit hour basis.

† In these colleges the prorating is on the basis of clock hours.

‡ 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.

§ 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.

¶ Prorating in this college is on the basis of clock hours except for academic courses for which the fee is $3 per credit hour for residents and $4.50 per credit hour for nonresidents.

Nonresident fees.—"All students who are and for six months prior to the date of registration have been domiciled in Minnesota shall pay resident fees."

"The responsibility of registering under proper residence is placed upon the student and it is the duty of each student at registration, if there be any possible question of his right to residence fees, under the rules of the Board of Regents, to raise the question with the Registrar."

"The following interpretations of the rule are approved:

"1. The residence of all students under 21 years of age shall follow that of their parents or other legal guardian.

"2. The appointment of a resident of Minnesota as a legal guardian shall not entitle a student to the resident fee privilege until after the expiration of six months from the date of such appointment.

"3. A statement of intention to establish domicile in the state is not evidence of domicile.

"4. Residence in Minnesota primarily as a student is not evidence of domicile, irrespective of the length of such residence.

"5. Continued residence in Minnesota during vacation periods or occasional periods of interruption to the course of study is not prima facie evidence of domicile.

"6. A student enrolled for a full program or substantially a full program will be considered to be in Minnesota primarily for the purpose of attending the institution in which he is enrolled.

"7. Employment by the University as a fellow, scholar, assistant or in any position normally filled by students is not to be considered evidence of domicile.

"8. The act of voting or registration for voting in Minnesota is not conclusive proof of domicile."

Tuition fees for students of one college taking work in another.—Where a student of a given college or school elects courses in another, such courses being accepted by the college in which the student is registered as a part of its curriculum, the tuition shall be that of the college in which he is registered.[1]

If, at any time, such student desires credit for this course towards the degree offered by the second college, he shall pay such additional tuition as is required by the second college, charged in accordance with the schedule indicated above.

This is not to be interpreted as applying to students in such combination courses as Arts and Medicine, Arts and Dentistry, Arts and Business, etc., provided such students pay regular quarter fees for the full period of residence in the higher fee college.

[1] A student paying full fees in a given college, electing courses in a lower fee college, shall pay no additional fees for the work so elected, but if electing in a higher fee college, may have the option of paying the pro rata fees of both or the full-time fees of the first and pro rata fees of the second.

INCIDENTAL FEE

An incidental fee of $8 a quarter is charged each student for which the student receives the privileges of the Minnesota Union or Shevlin Hall, the Health Service, 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 $8.40 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, fifteen dollars ($15) for men and five dollars ($5) for women, 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 students 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.
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[1] 5.00
Examination on subjects taken out of class[1] 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 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 certificating agencies, or to prospective employers. For additional transcripts, each 0.50
Graduation fee—Graduate School 10.00
Other schools and colleges 7.50

LATE FEES

Late registration.—The fee for the privilege of late registration, late change of registration, or late payment of fees shall be $2 prior to the day classes begin, on and after which the fee increases at the rate of $1 per day, provided no student shall pay more than $10 in fees for late privileges in any given quarter.

Library fines.—All overnight books taken from the "Reserves" must be returned at 8:30 the following morning. If not returned at that hour a fine of twenty-five cents will be imposed, and an additional ten cents charged for every hour or fraction of an hour thereafter the book is retained.

Books issued during the day for reading room use must be returned within two hours. If not returned promptly a fine of twenty-five cents for the first hour and ten cents additional for every hour or fraction of an hour thereafter that the book is overdue, will be charged. The two-hour limit will not be enforced between 6:00 p.m. and 10:00 p.m.

[1] Such an examination may be taken only upon approval of the appropriate committee.

REFUNDS

Tuition.—Students who cancel their registration before the close of any quarter are entitled to refunds of the tuition fee on the following basis:

After Quarter Opens	Percentage of Refund
No attendance	100
One day to one week	90
One week to two weeks	80
Two weeks to three weeks	70
Three weeks to four weeks	60
Four weeks to five weeks	50
Five weeks to six weeks	40

No student who has been in attendance more than one half of the quarter shall receive any refund of tuition.

Locker rental.—Full rental fee for lockers may be refunded during the first two weeks of a quarter. After that time no reduction is made.

Incidental fee.—Students in any college of the University, with the exception of the Institute of Technology, who cancel their registration before the end of the quarter, are entitled to a refund of the incidental fee on the same basis as the refund for tuition, except that in no case will more than $5 of the incidental fee be refunded. Students in the Institute of Technology will receive refunds of the incidental fee on the same basis, except that the extra forty cents of the incidental fee in this institute will be entirely refunded during the first two weeks of the quarter, and none of this extra forty cents will be refunded after the second week of the quarter.

LIST OF ACCREDITED PREPARATORY SCHOOLS

Graduates of the following Minnesota state high schools will be admitted to the University of Minnesota without conditions, provided their credentials satisfy the specific requirements of the college to which entrance is desired:

Ada
Adams
Adrian
Aitkin
Akeley
Alango
Albany
Albert Lea
Alberta
Alborn
Alden
Alexandria
Alvarado
Amboy
Annandale
Anoka
Appleton
Arco
Argyle
Arlington
Ashby
Askov
Atwater
Audubon
Aurora
Austin
Backus
Badger
Bagley
Balaton
Barnesville
Barnum
Barrett
Battle Lake
Baudette
Beardsley
Beaver Creek
Becker
Belgrade
Belle Plaine
Bellingham
Beltrami
Belview
Bemidji
Benson
Bertha
Big Falls
Big Fork
Big Lake
Bingham Lake
Bird Island
Biwabik
Blackduck
Blooming Prairie
Bloomington
Blue Earth
Borup
Boyd
Braham
Brainerd
Brandon
Breckenridge
Brewster
Bricelyn
Bronson
Brookston
Brooten
Browerville
Browns Valley
Brownton
Bruno
Buffalo
Buffalo Lake
Buhl
Burtrum
Butterfield
Byron
Caledonia
Cambridge
Campbell
Canby
Cannon Falls
Canton
Carlton
Cass Lake
Ceylon
Chandler
Chaska
Chatfield
Cherry
Chisago City
Chisholm
Chokio
Clara City
Clarissa
Clarkfield
Clear Lake
Clearbrook
Cleveland
Climax
Clinton
Cloquet
Clover Valley
Cloverton
Cokato
Coleraine
Columbia Heights
Comfrey
Comstock
Cook
Correll
Cotton
Cottonwood
Cromwell
Crookston
Crosby-Ironton
Cyrus
Danube
Dassel
Dawson
Deephaven
Deer Creek
Deer River
Delano
Delavan
Detroit Lakes
Dilworth
Dodge Center
Dover
Duluth
  Central
  Denfeld
  Morgan Park
Eagle Bend
East Chain
East Grand Forks
Echo
Eden Prairie
Eden Valley
Edgerton
Elbow Lake
Elgin
Elk River
Elkton
Ellendale
Ellsworth
Elmore
Ely
Embarrass
Emmons
Erskine
Evansville
Eveleth
Excelsior
Eyota
Fairfax
Fairmont
Faribault
Farmington
Felton

Fergus Falls
Fertile
Finlayson
Fisher
Floodwood
Foley
Forest Lake
Fosston
Franklin
Frazee
Freeborn
Frost
Fulda
Garden City
Gary
Gaylord
Gibbon
Gilbert
Glencoe
Glenwood
Glyndon
Gonvick
Goodhue
Goodridge
Good Thunder
Graceville
Granada
Grand Marais
Grand Meadow
Grand Rapids
Granite Falls
Grasston
Greenbush
Grey Eagle
Grove City
Hackensack
Hallock
Halstad
Hancock
Hanley Falls
Hanska
Harmony
Hastings
Hawley
Hayfield
Hector
Henderson
Hendricks
Hendrum
Henning
Herman
Heron Lake
Hewitt
Hibbing
Hill City
Hills
Hinckley
Hitterdal
Hoffman
Holdingford
Holloway
Hopkins
Houston
Howard Lake
Humboldt
Huntley
Hutchinson
Indus
International Falls
Isle
Ivanhoe
Jackson
Janesville
Jasper
Jeffers
Jordan
Karlstad
Kasota
Kasson
Keewatin
Kelliher
Kellogg
Kennedy
Kensington
Kenyon
Kerkhoven
Kiester
Kimball
Lake Benton
Lake City
Lake Crystal
Lake Park
Lake Wilson
Lakefield
Lakeville
Lakewood
Lamberton
Lancaster
Lanesboro
Laporte
Le Center
Le Roy
Le Sueur
Lester Prairie
Lewiston
Lindstrom-
  Center City
Litchfield
Little Falls
Littlefork
Long Prairie
Luverne
Lyle
Lynd
Mabel
Madelia
Madison
Magnolia
Mahnomen
Mahtomedi
Mankato
  High School
  Teachers' College
    High School
Mantorville
Maple Lake
Mapleton
Marietta
Marshall
Maynard
Mazeppa
McGrath
McGregor
McIntosh
Meadowlands
Medford
Melrose
Menagha
Mentor
Middle River
Milaca
Milan
Milroy
Minneapolis
  Boys' Vocational
  Central
  Edison
  John Marshall
  Miller
    Vocational
  North
  Roosevelt
  South
  Washburn
  West
Minneota
Minnesota Lake
Montevideo
Montgomery
Monticello
Montrose
Moorhead
  High School
  Teachers' College
    High School
Moose Lake
Mora
Morgan
Morris
Morristown
Morton
Motley
Mound
Mountain Iron
Mountain Lake
Murdock
Nashwauk
Nevis
New London
New Prague
New Richland
New Ulm
New York Mills
Newfolden
Nicollet
North Branch
North St. Paul
Northfield

Northhome
Norwood-Young America
Odessa
Ogilvie
Okabena
Oklee
Olivia
Onamia
Orr
Ortonville
Osakis
Oslo
Osseo
Owatonna
Park Rapids
Parkers Prairie
Paynesville
Pelican Rapids
Pemberton
Pequot
Perham
Peterson
Pillager
Pine City
Pine Island
Pine River
Pipestone
Planview
Plummer
Preston
Princeton
Proctor
Randolph
Rapidan
Raymond
Red Lake
Red Lake Falls
Red Wing
Redwood Falls
Remer
Renville
Robbinsdale
Rochester
Rockford
Rose Creek
Roseau
Rosemount
Round Lake
Royalton
Rush City
Rushford
Russell
Ruthton
Sacred Heart
St. Charles
St. Clair
St. Cloud
St. Francis
St. Hilaire
St. James
St. Louis Park
St. Paul
  Central
  Harding
  Humboldt
  John A. Johnson
  Mechanic Arts
  Washington
St. Paul Park
St. Peter
Sanborn
Sandstone
Sauk Centre
Sauk Rapids
Sebeka
Shakopee
Sherburn
Silver Lake
Sioux Valley, Lake Park, Ia.
Slayton
Sleepy Eye
South St. Paul
Spring Grove
Spring Valley
Springfield
Staples
Starbuck
Stephen
Stewart
Stewartville
Stillwater
Storden
Strandquist
Swanville
Taylors Falls
Thief River Falls
Thomson
Tintah
Toivola
Tower-Soudan
Tracy
Triumph
Truman
Twin Valley
Two Harbors
Tyler
Ulen
Underwood
Upsala
Verdi
Verndale
Villard
Virginia
Wabasha
Wabasso
Waconia
Wadena
Wahkon
Waldorf
Walker
Walnut Grove
Wanamingo
Warren
Warroad
Waseca
Watertown
Waterville
Waubun
Wayzata
Welcome
Wells
West Concord
Westbrook
Wheaton
White Bear
Williams
Willmar
Willow River
Windom
Winnebago
Winona
Winthrop
Wolverton
Wood Lake
Worthington
Wrenshall
Wykoff
Zumbrota

Graduates of the University High School and of the following private schools will be admitted to the freshman class under the regulations governing the admission of high school graduates. This list is corrected to February 1, 1939.

Austin
  St. Augustin High School
Bird Island
  St. Mary's High School
Caledonia
  Loretto High School
Collegeville
  St. John's University, High School Department

Crookston
- Cathedral High School
- Mount St. Benedict's Academy
- St. Joseph's Academy

Duluth
- Cathedral High School for Boys
- Cathedral High School for Girls
- Stanbrook Hall

Faribault
- Bethlehem Academy
- St. Mary's Hall
- Shattuck Military Academy

Frontenac
- Villa Maria

Graceville
- St. Mary's Academy

Hutchinson
- Maplewood Academy

Little Falls
- St. Francis High School

Mankato
- Bethany Lutheran College, High School Department
- Good Counsel Academy
- Loyola High School

Minneapolis
- Academy of the Holy Angels
- De La Salle High School
- Minnehaha Academy
- Northrop Collegiate School
- St. Anthony High School
- St. Margaret's Academy

Morris
- St. Mary's Academy

New Ulm
- Catholic High School

Rollingstone
- Holy Trinity High School

St. Cloud
- Cathedral High School

St. Joseph
- Convent of St. Benedict

St. Paul
- Academy of Concordia College
- Breck School
- College of St. Catherine (Derham Hall)
- Cretin High School
- St. Joseph Academy
- St. Paul Academy
- St. Thomas Military Academy
- Summit School
- Visitation Convent

Sleepy Eye
- St. Mary's High School

Wabasha
- St. Felix High School

Waseca
- Sacred Heart High School

Winona
- Cotter High School
- St. Thomas Cathedral High School

Graduates of Minnesota state high school departments which are on the recommended list of the State Department of Education are accepted on the same basis as the graduates of fully accredited preparatory schools.

LIST OF ACCREDITED COLLEGES

The following lists are correct as of February 1, 1939.

1. *Four-year colleges*

Augsburg College,[1] Minneapolis
Carleton College, Northfield
College of St. Benedict,[1] St. Joseph
College of St. Catherine, St. Paul
College of St. Scholastica, Duluth
College of Saint Teresa, Winona
Concordia College, Moorhead
Gustavus Adolphus College, St. Peter
Hamline University, St. Paul
Macalester College, St. Paul
St. John's University, Collegeville
St. Mary's College,[1] Winona
St. Olaf College, Northfield
St. Thomas College, St. Paul

2. *Minnesota teachers colleges*

Bemidji State Teachers College
Duluth State Teachers College
Mankato State Teachers College
Moorhead State Teachers College
St. Cloud State Teachers College
Winona State Teachers College

3. *Junior colleges*

Bethany Lutheran College, Mankato
Bethel Institute, St. Paul
Concordia College, St. Paul
Duluth Junior College
Ely Junior College
Eveleth Junior College
Hibbing Junior College
Itasca Junior College, Coleraine
Rochester Junior College
St. Mary's Hall, Faribault (for one year's work)
Virginia Junior College
Worthington Junior College

[1] Graduates of this institution may be admitted to the Graduate School under certain specified conditions.

REGULATIONS

GOVERNING GRANTING OF DEGREES

The Board of Regents will confer the degree appropriate to the course pursued under the following conditions:

1. *Curriculum requirements.*—Certification by the registrar of the completion of all requirements of the course of study as outlined in the college announcement, or its equivalent as determined by the faculty of the college offering the course.

2. *Recommendation of the faculty.*

3. *Residence requirement.*—The student must earn at least one year's credit in residence in this University. If the term of residence is only one year, that year must be the senior year; and in any case he must spend two quarters of the senior year in residence. In addition, special residence requirements must be met in several of the schools and colleges. See individual announcements.

4. *Payment or satisfactory arrangement of all financial obligations* due the University.

5. *Attendance at commencement.*—A candidate for a degree is required to be present at the commencement exercises at which his degree is conferred provided that the candidate's work is completed at the end of a quarter when such exercises are held.

A student who fails to attend shall not receive his diploma until the expiration of one year, unless in the meantime he attends commencement exercises or unless he is excused from such attendance by the dean of the college and the president of the University.

GOVERNING PUBLICITY MATERIAL

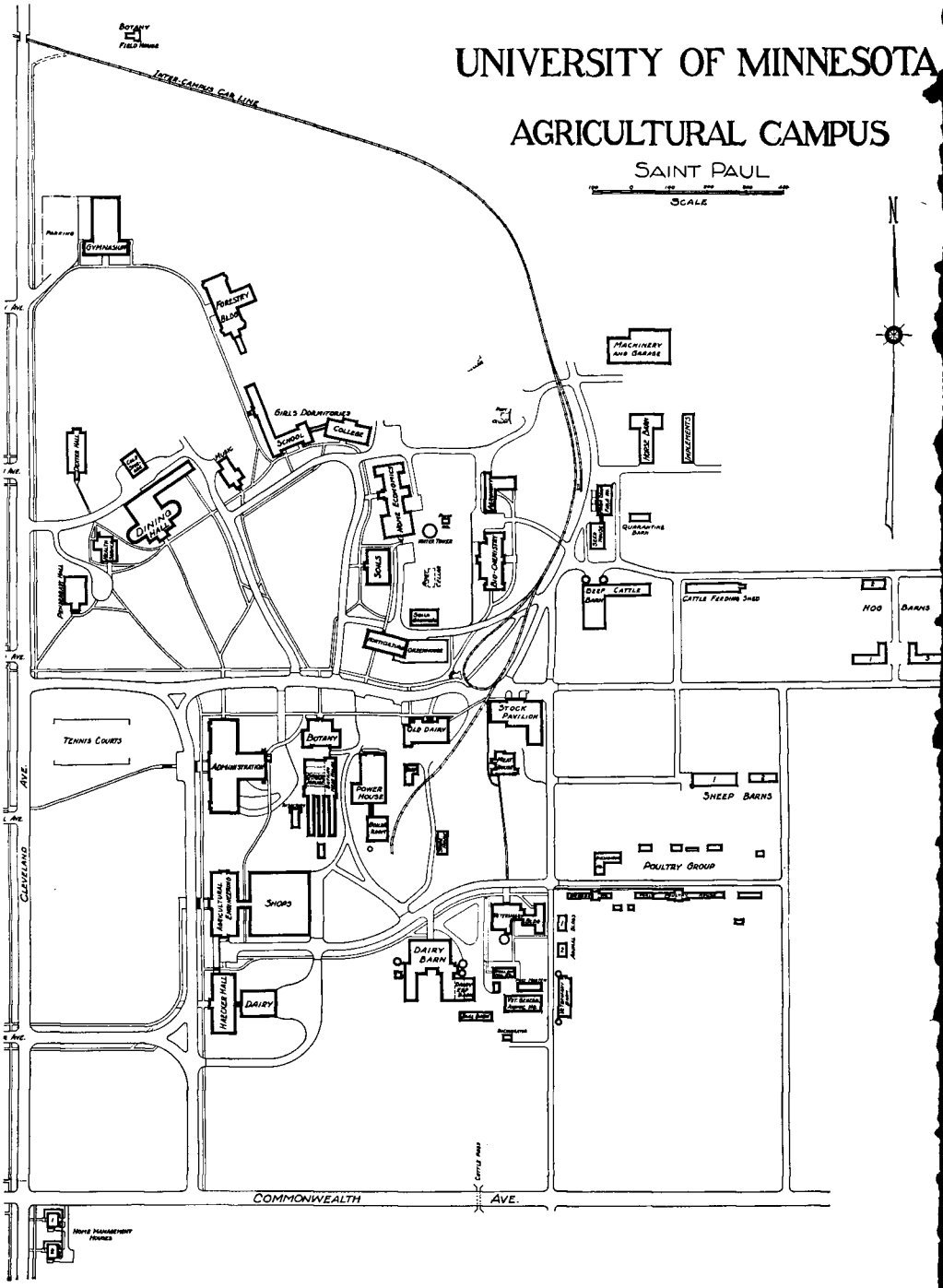
All signs, posters, announcements, and other publicity material must be confined to the bulletin boards and the other officially recognized university channels of publicity, and their display must be approved by Dean Nicholson, 213 Administration Building, University of Minnesota.

INDEX

UNIVERSITY OF MINNESOTA

AGRICULTURAL CAMPUS

SAINT PAUL



The Bulletin *of the* University *of* Minnesota

The Summer Session

Announcement of Courses

1939

First Term June 19 to July 28

Second Term July 31 to September 1

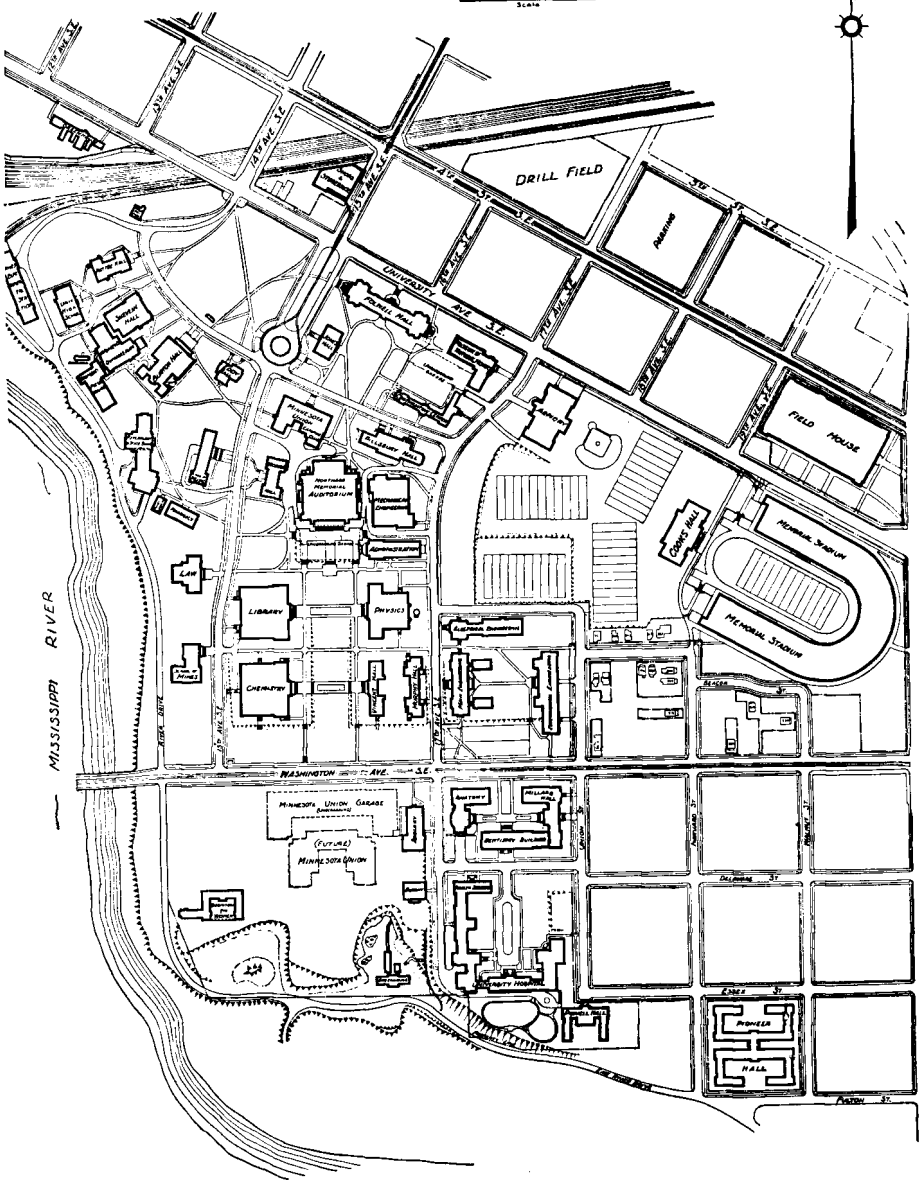
Vol. XLII *No. 10* *March 18 1939*

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 OF MINNESOTA

MAIN CAMPUS



UNIVERSITY OF MINNESOTA

AGRICULTURAL CAMPUS

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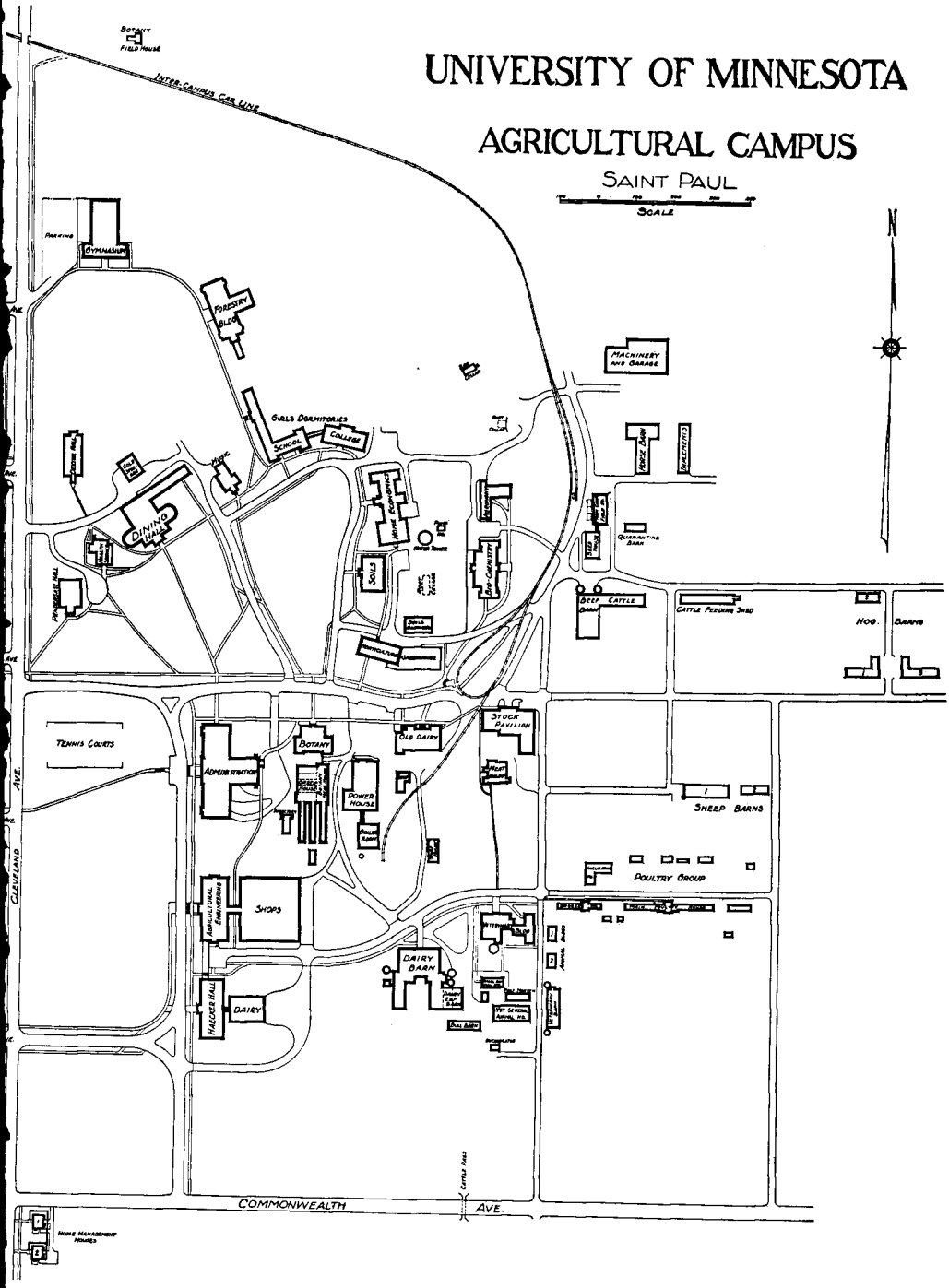

CALENDAR

SUMMER SESSION, 1939

June	19-20	Mon.-Tues.	Registration, first term
June	21	Wednesday	First term classes begin
July	4	Tuesday	Independence Day, a holiday
July	27	Thursday	Commencement convocation
July	28	Friday	First term closes
July	31	Monday	Registration and payment of fees for second term close at 3:00 p.m.
August	1	Tuesday	Second term classes begin
September	1	Friday	Second term closes

TABLE OF CONTENTS

BOARD OF REGENTS

The Hon. James F. Bell, Minneapolis	1945
The Hon. Daniel C. Gainey, Owatonna	1943
The Hon. Richard L. Griggs, Duluth	1945
The Hon. George W. Lawson, St. Paul	1945
The Hon. William J. Mayo, Rochester	1941
The Hon. E. E. Novak, New Prague	1943
The Hon. A. J. Olson, Renville	1943
The Hon. Albert Pfaender, New Ulm	1941
The Hon. Ray Quinlivan, St. Cloud	1945
The Hon. F. J. Rogstad, Detroit Lakes	1943
The Hon. Fred B. Snyder, Minneapolis	1941
The Hon. Sheldon V. Wood, Minneapolis	1941

ADMINISTRATION

Guy Stanton Ford, Ph.D., Litt.D., LL.D., President
William T. Middlebrook, B.A., M.C.S., Comptroller
Thomas A. H. Teeter, B.S. (C.E.), Director of the Summer Session
Edward E. Nicholson, M.A., Dean of Student Affairs
Anne D. Blitz, M.A., LL.D., Dean of Women
Frank K. Walter, M.A., M.L.S., University Librarian
Rodney M. West, B.A., Registrar
Ralph A. Piper, M.A., Assistant Professor, in charge of Physical Recreation

THE SUMMER SESSION

The 1939 Summer Session of the University of Minnesota has been planned essentially with the idea of providing maximum service to the state and its adjoining areas, and of broadening the training of teachers and educational workers at all levels. In both the academic and the professional fields the offerings are comprehensive, and a number of outstanding visiting instructors will supplement the regular staff.

In elementary education an exceptional offering will be provided for teachers, supervisors, and administrators. Particular emphasis will be given to problems of elementary teaching in the social studies, arithmetic, and reading; to diagnostic and remedial instruction; and to problems of supervision. The work of the Kindergarten and Child Welfare departments will be supplemented by the use of the Tuttle Elementary School, where demonstrations and observations will be available in connection with most of the courses.

High school teachers and administrators, also, will find an expanded offering for the 1939 Summer Session. Advanced courses will provide discussions of current problems of the junior and senior high school, as well as consideration of materials and methods for teaching secondary school subjects. The University High School will provide demonstrations of practical applications in this field.

The Minnesota summer offering in school administration is always strong. Visiting instructors and regular staff members will give unusually valuable and practical courses for the 1939 Summer Session, with special provision for advisory work on graduate research studies.

As a new departure, a course on management and supervision of rural schools has been arranged for the last three weeks of the first term, to meet the needs of county superintendents unable to attend for the entire six-week period. Students registering for this course may also enter the course in Minnesota School Laws and Regulations for the three-week period.

The Minnesota Education Association has taken for its principal study during the next biennium the revision of curricula. During the Summer Session, the College of Education will offer basic and advanced courses in the curriculum field at both elementary and secondary school levels, with laboratory work for curriculum revisions.

As last year, the Departments of Psychology and Education are combining to give training in guidance and personnel work, with added emphasis on advanced courses. The offerings include training in the use of tests and other diagnostic materials, the psychology of personality, the procedures of counseling, and clinical practice.

For many years, there has been a demand for extended offerings in philosophy and history of education and in the social problems of education. The offerings in these fields in both terms will provide background for the consideration of modern educational problems. Of interest to all groups, also, will be courses in radio in education, and safety education.

Workers in higher education, teacher training, and adult education will find courses of primary value in their fields. An expanded offering has been arranged for the first term in physical education, agricultural education, and home economics education, and for both terms in art education, industrial education, and music education.

For educational workers, the 1939 Summer Session will offer the most extensive program given at the University of Minnesota for many years. Both graduate and undergraduate students will find a program designed to keep them abreast with the latest educational developments.

In both the academic and the professional fields, the offerings are comprehensive. Two six-week sessions have been scheduled, and a full quarter of university work may be completed in the combined sessions.

SPECIAL COURSES

A four-week summer term is provided for teachers of agriculture who are employed on the twelve-month basis as teachers. Courses carrying graduate credit are available. A maximum of six credits per term is permitted. The term of four weeks begins Monday, June 19, and closes Friday, July 14.

There is also a wealth of courses offered in the sciences and the professional schools.

The Department of Preventive Medicine and Public Health and the School of Nursing offer a teacher training course for instructors in home hygiene and care of the sick.

The Forestry and Biological Station is conducted co-operatively by various departments in the College of Agriculture, Forestry, and Home Economics and the College of Science, Literature, and the Arts of the University of Minnesota. During the second term of the Summer Session it offers elementary and advanced courses in biology at Itasca Park. Opportunities are offered for research and investigation in several fields of biology and forestry.

Apropos of the growing interest in aeronautics, the Department of Aeronautical Engineering offers this year a general course in aeronautical engineering intended primarily for men who want to acquire a general knowledge of the principles involved in the construction and operation of aircraft. This course also will be suitable for teachers of physical sciences, mathematics, and manual training in the high schools.

SPECIAL COURSE FOR ELEMENTARY TEACHERS

The College of Education, the Institute of Child Welfare, and the Kellogg Foundation will offer co-operatively a laboratory in elementary instructional practices for selected teachers. Students in this course will register for nine credits, spending one third of their time in the study of the psychology of the elementary school child and the other two thirds in observation and discussion of the applications of psychology in elementary school situations. This course, which may be counted toward an advanced elementary certificate, will be open to twenty-five teachers from Minnesota and adjoining states. Since the number to be admitted is limited, teachers who

are interested should write to the dean's office, College of Education, as soon as possible for approval of their registration in this course. (See Ed.C.I. 187su.)

INSTITUTE OF CHILD WELFARE

The Institute of Child Welfare, an organization for the scientific study of children, for the training of workers in the field of child development, and for the dissemination of information through a program of parent education, is offering a full program including both graduate and undergraduate courses in the first term of the Summer Session and several courses in the second term.

During the first term a nursery school and kindergarten is operated by the institute. For information as to fees for the Nursery School and Kindergarten, and a description of the courses offered see the section on the Institute of Child Welfare, page 115.

PLAY PRODUCTION

Six allied courses designed for teachers, community leaders, and others who are engaged in play production will be presented by the University Theatre staff between July 5 and 21. Courses in direction, stage scenery, stage lighting, acting, and make-up will be taught (fifteen one-hour meetings of each course). Address requests for full information to University Theatre or Center for Continuation Study, University of Minnesota, Minneapolis, Minnesota.

SUMMER SCHOOL FOR ENGINEERS AND CUSTODIANS

From June 12 to June 16, 1939, the General Extension Division will conduct a short course for engineers and custodians of schools and other public buildings. This course will comprise an intensive practical training for ambitious men who have taken a serious interest in this vocation. Further information may be obtained by writing the General Extension Division, Department J, 402 Administration Building, University of Minnesota, Minneapolis.

DATES OF THE SUMMER SESSION

The Summer Session at the University of Minnesota consists of two terms. The first term, of six weeks, will begin with registration, Monday and Tuesday, June 19-20. Classes will begin Wednesday, June 21, at 8:00 a.m. The first term will close Friday, July 28. Registration and payment of fees for the second term will close at 3:00 p.m., Monday, July 31. Classes for this term will open Monday, July 31, and the Summer Session will be brought to a close on Friday, September 1.

GENERAL INFORMATION

The University of Minnesota, located midway between the Twin Cities of Minneapolis and St. Paul, yet easily accessible to the vast outdoor playground of northern Minnesota, provides an ideal place to enjoy a profitable summer of study and healthful relaxation.

On its Main campus, situated on the north bank of the Mississippi River in Minneapolis, the University places at the disposal of the Summer Session student the unexcelled facilities of a great educational institution—its libraries, laboratories, observatory, and museums—and in addition the recreational resources of its several swimming pools, golf course, and tennis courts. These factors, plus the added cultural advantages of two large metropolitan centers, combine to offer attractions for the Summer Session student that are unique with the University of Minnesota.

Courses in agriculture and home economics are given on the University Farm campus in St. Paul, three miles from the Main campus in Minneapolis. The Farm campus offers all of the advantages of the Main campus, being connected with the latter by an intercampus trolley line which gives regular service free to students enrolled for classes on both campuses. The Como-Harriet interurban line also connects the campus with the two cities, thus making available all their advantages. The College of Agriculture, Forestry, and Home Economics has its own library, laboratories, and recreational facilities.

The Summer Session of the University of Minnesota provides courses (1) for those graduate and undergraduate students, both in the arts and in the professional schools, who wish to reduce their period of residence at the University by accumulating credits during the summer; (2) for superintendents, principals, supervisors, teachers, and other students of professional interests who desire further training in their fields; (3) for persons who seek an opportunity to study for intellectual pleasure; (4) for graduates of accredited high schools who do not meet the special subject-matter requirements to enter some of the colleges and professional schools; (5) for high school graduates who wish to become acquainted with the methods of instruction and the policies and practices in collegiate work before registering in the regular session during the academic year.

A full quarter's work is offered in the two terms, making possible a four-quarter year for students who desire it.

Particular attention is called to the advantages of study in the second term when classes are smaller and more intimate, and the weather is usually decidedly cooler. The School of Business Administration, College of Education, Forestry and Biological Station at Itasca Park, and the Departments of Physics, Sociology, and Speech offer particularly good programs in the second term.

Students registering in the second term who are teachers and are obliged to return to their schools before the close of the term, may, with the consent of instructors, arrange to complete the work *in absentia*. The granting of such permission is not obligatory on any instructor, *and students desiring this privilege should ascertain well in advance the courses in which the permission will be granted.* They may then make a program accordingly.

The procedure is that of removing a grade of incomplete by examination. To avoid later misunderstanding, the student should secure the permission of the instructor at the beginning of the term, and then arrange with the registrar for the proper examination.

INTERCAMPUS CAR

For students who are registered for class work on both the Minneapolis campus and the Univeristy Farm campus, free transportation on the intercampus car is provided. Tickets will be issued to students registered in the College of Agriculture, Forestry, and Home Economics at the branch office of the registrar at University Farm; to those registered in other colleges, at the university post office in the basement of the Administration Building, Minneapolis campus.

Students who are registered for classes on the Minneapolis campus and who live in the College of Agriculture dormitories will also be given free transportation. Tickets will be issued by the registrar's office, University Farm.

GENERAL OFFICES

The office of the director of the Summer Session is in Room 406 on the fourth floor of the Administration Building on the Main campus. The offices of the registrar and cashier are on the first floor of the Administration Building. For the convenience of students registering in agriculture and home economics, branch offices are established on the second floor of the Administration Building, University Farm. Details of procedures to be followed in registering will be given out at these places. The several schools and colleges function in the control of students during the summer just as during any other quarter of the year. Students in one college are free to elect courses in another college, however, on approval of the dean of the college in which the student is registered.

BUREAU OF RECOMMENDATIONS

The Bureau of Recommendations of the College of Education is operative during the Summer Session. Students who have earned 30 quarter credits at the University of Minnesota are eligible to the active services of the bureau. These services consist in recommending candidates and forwarding their confidential credentials to school officials in many parts of the country who have vacancies on their teaching or administrative staffs. Superintendents who are looking for teachers will be given full and reliable information on competent candidates, experienced or inexperienced, if they write to or call at the office of the bureau in Room 208, Burton Hall.

UNIVERSITY LIBRARY

The University Library is open to all students of the Summer Session. It includes about 1,050,000 volumes and many periodicals and pamphlets covering all subjects in the university curriculum.

The largest part of the library is housed in the Library Building on the Minneapolis campus. This is one of the largest and best university library buildings in the country. Its spacious reading rooms and a special floor with seminar, library groups, and discussion rooms for advanced students afford a greater seating capacity than any similar building yet erected. The library of the Department of Agriculture, with an excellent collection on agriculture and home economics, is located in the Administration Building

at the University Farm. Branch libraries are maintained in a few of the schools and colleges, and there are smaller special collections conveniently grouped in the main library.

In addition to the University Library and its branches, the Minneapolis Public Library, the St. Paul Public Library, the Minnesota Historical Society, and the James Jerome Hill Memorial Library of St. Paul grant liberal privileges to Summer Session students.

The Library Handbook, copies of which may be had gratis upon application at the library, contains information regarding library hours, rules, and other matters essential to the profitable use of the library.

CORRESPONDENCE STUDY COURSES

The Correspondence Study Department of the General Extension Division affords an opportunity to students who come to the University only for the Summer Session to continue their studies during the remainder of the year, and thus accumulate additional credit toward their degrees as well as to secure the training which regular study gives. On the other hand, students who are now pursuing correspondence study courses have in the Summer Session a chance to complete some of their residence work at a time when many of them are free to do so. All those who are interested and who register for the Summer Session are urged to call at the office of the General Extension Division to become acquainted with its work. Full information concerning correspondence study courses may be had at any time by addressing the Correspondence Study Department, General Extension Division, 402 Administration Building.

MINNESOTA UNION

The Minnesota Union is a men's clubhouse, furnishing social and recreational facilities and operating a soda fountain. There are also a ballroom, reception rooms, reading rooms, and lounging rooms. These rooms and their facilities are open to all men students.

The Minnesota Union cafeteria will be open during the Summer Session, for both men and women.

SHEVLIN HALL

Shevlin Hall affords to women students what the Minnesota Union affords to men. It contains rest and study rooms, rooms for social gatherings, the offices of the dean of women, and the Housing Bureau.

For women students on the University Farm campus similar facilities are available in the Home Economics Building.

UNIVERSITY POST OFFICE

The university post office, for distribution of mail addressed to the University, is located in the basement of the Administration Building on the Minneapolis campus. The University Farm post office is in the Administration Building on the Farm campus. At the time of registration each student is assigned a post-office box in which he will receive all mail, announcements, and university communications. The mail box should be visited at least

once a day. When leaving at the close of a term, students should give the postmaster a forwarding address.

OFFICIAL DAILY BULLETIN

Throughout the year an official daily bulletin is issued. In addition to the announcements to students and faculty it contains other information, programs of the various recreational activities, and matters of general interest which would ordinarily be found only in a daily student newspaper. The bulletin is delivered to offices and laboratories, and to the post-office box of every student each morning on which it is published. *Each student is held responsible for a knowledge of such information appearing in the official notices as may affect him.*

STUDENTS' HEALTH SERVICE

The Students' Health Service conducts a dispensary during the Summer Session on the same basis as any other quarter of the year, the same staff of physicians, dentists, and nurses being on duty. This dispensary maintains exclusively for students, clinics in medicine, surgery, dermatology, ophthalmology, otolaryngology, and dentistry. Hospitalization, whenever necessary for students, is provided in the "private patient" section of the University of Minnesota Hospitals. Home calls are not made during the Summer Session.

An unusual opportunity for a complete physical examination is offered by the Students' Health Service to those in attendance during the Summer Session. An annual physical examination is recognized as the only method of discovering chronic disease processes at a time when they are curable and the wisdom of procuring such annual examinations is being widely recognized by the public. The University has made an examination service available to students during the Summer Session and each year a large number of students has taken advantage of this opportunity. A charge of $4 is made for this service.

For special drugs, X rays, dentistry, and hospital board, a charge on a strictly cost basis is made. This service is maintained by the University to help each student to possess a healthy, active body, thereby contributing to his success while in college and in later life; and to reduce to a minimum that prodigious academic and economic loss due to indisposition and illness of students.

LIVING EXPENSES

The living expenses for students at the University are never very high, and this is true especially of the Summer Session. Good accommodations for room may be had from $10 to $15 per month. Meals can be secured for 75 cents per day and up. In addition to the cafeterias conducted on the campus by the University, several good restaurants are to be found in the immediate vicinity of the University. Further information concerning room and board may be obtained by addressing the director, Housing Bureau, Shevlin Hall. *It is generally more satisfactory to engage accommodations after arrival than to make reservations in advance, except in the case of reservations at Sanford Hall and Pioneer Hall.*

DORMITORIES FOR MEN

Pioneer Hall, a residence hall for men at the University of Minnesota, is ideally located to provide comfortable living accommodations the year around. An attractive colonial structure, capable of housing 535 persons, Pioneer Hall overlooks the Mississippi River at a point two blocks from the campus and is easily accessible by street car and bus from the downtown districts, both of Minneapolis and St. Paul. The building, which is fireproof, is arranged in two units of eight houses, each unit forming a quadrangle. It has been built and equipped to provide the most desirable residence advantages at very moderate cost.

Most of the rooms are arranged in three-room suites for two students, a suite consisting of a separate bedroom for each student and a common study. Some single and a few double rooms also are provided for students who prefer such arrangements. The rooms are furnished in a comfortable and convenient manner, students being supplied with a combination of wardrobe and dresser, bed, chair, study table, arm chair, rug, wastebasket, bed linen, and bed cover. Students should furnish blankets, study lamps, towels, and other personal necessities. Maid service is provided.

Pioneer Hall offers many advantages in the way of recreation facilities. In addition to its well-furnished and comfortable lounges, facilities for golf driving, shuffleboard, handball, pool, billiards, table tennis, chess, and checkers are to be found in its game rooms. Also, a very modern soda fountain has been installed for the convenience of its residents. Most of these facilities are available during the Summer Session.

Pioneer Hall will be open for room but not for board during both terms. Students interested in residence in the hall should write to the director of Pioneer Hall, University of Minnesota, for a copy of the special bulletin and an application form. A two-dollar deposit fee must accompany application. Assignments will be made in the order of application.

DORMITORIES FOR WOMEN

Sanford Hall

Sanford Hall, a residence hall for women, is on the Minneapolis campus. It accommodates 245 students. The building has every modern convenience, with hot and cold running water in the rooms. Each double room has two closets.

Each room is furnished with a bed, dresser, study table, rugs, chair, clothes closet, and all necessary bedding. Bed linen is furnished and laundered by the University.

Rooms are offered *with* board during the first term and *without* board during the second term. Maintenance charges are payable at the time of registration. Reservations should be made as far in advance as possible. Applications, accompanied by a two-dollar deposit, should be sent direct to Sanford Hall, University of Minnesota. No application will be recorded until a lease is signed, accompanied by a two-dollar deposit. The deposit will hold the room until the day after the opening of the Summer Session, and is applied on the maintenance charge.

Communications requesting residence or regarding prices or any other details should be addressed to the house director, Sanford Hall.

Department of Agriculture Dormitories

Women taking regular work during the first term of the Summer Session, either on the Minneapolis or on the Farm campus, also high school students registered in the University Demonstration High School, may obtain rooms in the Department of Agriculture dormitories. There is convenient street car service to the Main campus. The dormitories contain a few single rooms; other rooms are intended to accommodate two persons. Necessary bedding and hand towels are furnished.

The rates during the summer are as follows: single rooms, $2.50 per week; other rooms, $2.25 per week per occupant.

Assignment of rooms will be made at the time of registration, in the Farm campus Administration Building. Payment for the first term of the Summer Session must be made to the cashier, University Farm, at the time of assignment. Dormitories will be open Saturday, June 17. They will not be available during the second term.

A cafeteria with reasonable charges is maintained on the Farm campus.

ADMISSION AND REGISTRATION

ADMISSION

The courses of the Summer Session are open to all qualified high school graduates. Persons of maturity whose preparation does not meet the entrance requirements, may be admitted as unclassed students on approval of the dean of the college or school concerned. Those who desire college credit for their work, and those who desire advanced standing for college work done elsewhere, should submit their credentials, consisting of official transcripts of their high school, normal school, or college work.

Students should consult the statements in the bulletins of the respective colleges of the University of Minnesota for detailed information concerning admission to a given college. General information may be found in the General Information Bulletin. Any of these bulletins may be obtained by calling upon or writing to the registrar, University of Minnesota, Minneapolis.

For the convenience of students, certain information is given in this bulletin at the opening of the respective sections of descriptions of courses.

REGISTRATION

In order that the short terms may prove of maximum value, and that the work of the courses may not be interfered with by late entrants, students must complete their registration, including the payment of their fees, on the days set for registration, or pay a late registration fee.

The regular registration days are:

For the first term, Monday, June 19, 9:00 a.m. to 4:00 p.m., and
Tuesday, June 20, 9:00 a.m. to 4:00 p.m.

For the second term, Monday, July 31, 9:00 a.m. to 4:00 p.m.

The late registration fees are as follows:

For the first term for those completing the registration on

Wednesday, June 21	$2.00
Thursday, June 22	3.00
Friday, June 23	4.00
Monday, June 26	5.00

No registrations are allowed for the first term after Monday, June 26, without the special permission of the dean of the school or college concerned, and the payment of the late registration fee of $5.

For the second term, for those completing their registration on

Tuesday, August 1	$2.00
Wednesday, August 2	3.00
Thursday, August 3	4.00
Friday, August 4	5.00

No registrations will be acepted later than Friday, August 4, without the special approval of the dean of the school or college concerned, and the payment of the late registration fee of $5.

No provision is made for allowing exemption from the late registration penalties to those who are unable to reach the University during the regular registration days.

The University reserves the right to cancel any and all courses in which the registration is insufficient to warrant continuation of the course.

Candidates for admission to all colleges except the College of Agriculture, Forestry, and Home Economics will register in the Armory. Candidates for admission to the College of Agriculture, Forestry, and Home Economics will register at University Farm, 205 Administration Building.

Changes in Registration

After a student's registration has been accepted by the registrar any change must be approved by the Students' Work Committee or the dean of the college in which the student is registered. *Only in exceptional cases will any change be made after classes have begun.*

FEES

The following fees are payable each term by each full-time student at the time of registration and must be paid before registration is complete:

Tuition fee (per term)	$21.80
Incidental fee‡ (per term)	3.20
Total fee (per term)	$25.00
Part time (4 credits or less) (per term)	$11.80
Incidental fee‡ (per term)	3.20
Total (per term)	$15.00
General deposit	$2.00

‡ An incidental fee of $3.20 a term is charged each student for which the student receives the privileges of the Minnesota Union or Shevlin Hall, the Health Service, the Official Daily Bulletin and the university post-office service.

In addition certain courses carry a fee as indicated in the description of those courses.

Graduate students who have completed all their graduate work with the exception of their theses will be allowed to register in the Summer Session for *thesis work only* upon the payment of a $5 tuition and a $2 deposit fee.

Charges for lockers, laboratory, breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

For fees for students desiring legal time credit in the Medical School, see page 72.

For fees for students registered for clinical courses in the School of Dentistry, see page 89.

For fees for students registered for music courses, see page 36.

For fees for students registered for nursing courses, see pages 74-75.

Refund of Fees

Students who cancel their Summer Session registration without class attendance shall be allowed a full (100 per cent) refund of fees. Students who cancel after having attended classes shall be allowed a refund of fees on the following basis:

Length of Term	80 Per Cent Refund for Attendance	No Refund for Attendance of More Than
6 weeks	1 day to 1 week	1 week
5 weeks	1 day to 5 days	5 days
4 weeks	1 day to 4 days	4 days
3 weeks	1 day to 3 days	3 days
2 weeks	1 day to 2 days	2 days
1 week	1 day	1 day

AUDITORS

Fees for auditors are the same as for students registered for credit. Permission to attend classes as auditors may be granted by the dean of the college or school with the consent of the department concerned. The form of registration as auditors shall be the same as of registration for credit, except that "auditor" shall be indicated on both registration sheet and class card. It is expected in general that auditors will be registered in at least one course for credit, but this regulation may be waived in exceptional cases.

CREDIT

Credit is administered on the following basis: One quarter credit requires in general not less than 10 lecture or recitation periods (2 per week for a summer term) requiring two hours of preparation each or not less than 20 periods of laboratory work requiring one-half hour of preparation each; or not less than 30 hours of laboratory work with no preparation. Courses carrying two or more units of credit require corresponding multiples of these amounts.

AMOUNT OF WORK

A maximum of 9 credits or two 5-credit courses is considered a full program for either term. Registration for a greater number requires special permission from the Students' Work Committee or the dean of the school or college in which the student is registered.

Examinations are held at the last scheduled class hour for each course.

GRADING SYSTEM

There are four passing grades, A, B, C, and D, representing varying degrees of achievement.

There are two grades indicating work of distinctly unsatisfactory quality. These grades are E (condition), which may be removed by examination or other means stipulated by the faculty of the college or school concerned, and F (failure), which may be converted into a higher grade only by a repetition of the work in the course or, in exceptional cases, by examination by permission of the faculty concerned.

The grade I (incomplete) indicates that a student, for reasons satisfactory to the instructor in charge, has been unable to complete the work of the course. This grade is given only when the work already done has been of acceptable quality. Any student receiving this grade will be given an opportunity to complete the said course within the first thirty days of his next quarter in residence, or in case of a student who is not in attendance during other quarters of the year, special arrangements may be made by the registrar if application is filed before the end of the summer term.

An opportunity to remove conditions received for a previous quarter will be given each term on the afternoon of the first Monday after classes begin. A fee of $1 is charged for the privilege of taking this examination at the scheduled time. A fee of $5 is charged for each special examination.

DEGREES

Regular collegiate credit is given to qualified students for work in the Summer Session. For a detailed statement of the credit requirements for the various degrees, see the Bulletin of General Information and the bulletins of the various schools and colleges of the University.

Work completed in the Summer Session is considered as residence credit.

The Board of Regents will confer the degree appropriate to the course pursued under the following conditions:

1. *Curriculum requirements.*—Certification by the registrar of the completion of all requirements of the course of study as outlined in the college announcement, or its equivalent as determined by the faculty of the college offering the course.

2. *Recommendation of the faculty.*

3. *Residence requirement.*—Advanced standing will be allowed on certification from other recognized institutions and may be obtained also by examination held before a committee of the faculty appointed for that pur-

pose provided that the following minimum requirement for residence at the University of Minnesota has been met.

The student must earn at least one year's credit in residence in this University. If the term of residence is only one year, that year must be the senior year; and in any case he must spend two quarters of the senior year in residence. In addition, special residence requirements must be met in several of the schools and colleges. See individual announcements.

4. *Attendance at commencement.*—All candidates for degrees are required to be present at commencement exercises provided that the candidate's work is completed at the end of a quarter when such exercises are held. Commencement exercises will be held Thursday, July 27, 1939.

A student who fails to attend shall not receive his diploma until the expiration of one year, unless in the meantime he attends commencement exercises or unless excused from such attendance by the dean of the college and the president of the University.

5. *Graduation fee.*—Graduate School, $10; other schools and colleges, $7.50.

SUMMER RECREATION

The University of Minnesota is ideally situated for a program of healthful recreation. A definite program is planned each year to give the Summer Session student a maximum of recreational activity for a minimum expense. As previously stated, the Twin Cities, with their parks, lakes, art and music centers, libraries, and museums, offer many fine attractions for the summer visitor.

As a gateway to the countless resorts on Minnesota's famed 10,000 lakes, the Twin Cities also provide an advantage for the summer visitor seldom found anywhere else. Many students will find it convenient and pleasant to spend week ends at some of these resorts and centers for recreation.

Informal social evenings.—Included in the recreational program are regularly arranged informal social evenings on the campus where students are given the opportunity of becoming better acquainted with each other and with members of the faculty. A regular series of these programs, including dancing and other entertainment, is planned for each session.

Excursions.—A number of excursions to points of historical, industrial, educational, or purely recreational interest in the vicinity of the Twin Cities also are made each summer. These tours are usually arranged for Monday, Friday, and Saturday afternoons, with the cost only the necessary street car or bus fare.

Physical activities.—The physical education plant at the University of Minnesota is one of the finest in the United States. Its facilities for healthful exercise are many and varied. These may be summarized briefly as follows: Recreation Field, an eighteen-hole golf course; three gymnasiums containing five swimming pools—Cooke Hall for men, the Women's Gymnasium, and the Farm Gymnasium; Northrop Field which contains facilities for baseball, track, diamond ball; 25 tennis courts, and space for minor sports.

A program of tennis and golf tournaments, a baseball and diamond ball schedule, as well as other competitive sports are arranged each summer.

In addition, the swimming pools are available at all times with attendants and instructors in charge. All of these facilities are available for both men and women and most of them with no extra charge except for towel service.

Tennis and golf tickets.—The use of the tennis courts is restricted to those holding tickets. Such tickets will be issued only to regularly enrolled students of the Summer Session and members of the staff, upon payment of a fee of $1 for each term and presentation of the bursar's receipt for fees. Golf tickets are issued in the same manner without charge, but a greens fee of 50 cents is charged for a single round, or ten rounds for $4.50. Before 10:30 a.m., except Saturday, Sunday, or holidays, and after 5:00 p.m. the charge will be 35 cents per round. Application should be made to the Athletic Department, Cooke Hall.

SPECIAL FEATURES

Lectures and convocations.—One of the principal features of the Summer Session program is the series of weekly convocation addresses by speakers of more than usual prominence. Scientists, literary figures, artists, observers of national and international affairs are among those who visit the campus to address these Summer Session audiences. In addition, an almost daily series of lectures by faculty members and invited guests adds to this feature of the program.

Concerts and recitals.—Each week those who enjoy good music will find opportunity to enjoy a musical program or a lecture-recital in the concert hall of the Music Building or in Northrop Memorial Auditorium. These programs are free to students.

Dramatics.—Performances of legitimate drama also have become an outstanding feature of the Summer Session. The University Theatre, a university dramatic student organization, functions throughout the summer and demonstrates the success attainable with student actors. For these offerings the very best of stage equipment and facilities is provided.

Newsreels.—Another feature which has proved increasingly popular is the Newsreel Theater under the direction of the Visual Education Department of the University. Motion pictures of current events, travel pictures, and educational films of various kinds form the subject-matter of the theater. Its weekly showings have been well attended in the past.

MINNESOTA BOOKMAN'S EXHIBIT

The Minnesota Bookman's Association will conduct an exhibit of textbooks in the Minnesota Union from June 26 to June 30. The newest books of interest to teachers will be placed on display. This exhibit affords an opportunity for superintendents as well as teachers to acquaint themselves with the latest educational material.

SUMMER EMPLOYMENT

Students are advised not to engage in extra work during the summer; a full program of study during the warm weather should, with reasonable recreation, be a sufficiently heavy load. But for the benefit of those who

feel compelled to aid themselves financially while in attendance, the service of the University Employment Bureau is always available. Many students are aided by this bureau which is on the basement floor of the Administration Building.

EXPLANATIONS

The following pages contain announcements of the courses offered in the several colleges and schools of the University. Departmental statements also indicate certain requirements as to entrance and credits. For more detailed statements of these matters, reference should be made to the Bulletin of General Information and the regular annual bulletin of the college concerned.

The University of Minnesota reserves the right to cancel any and all courses in which the registration is insufficient to warrant continuation of such course or courses.

Following each course is a statement, in parentheses, of credits, classes of students eligible, prerequisites, days of the week, class hours, and location of the class. Thus (3 cred.; jr., sr., grad.; prereq. 12, 13; MTWThF II; 117F) means that the course carries three credits, is open to junior, senior, and graduate students, has for prerequisites Course 12 and 13, meets on Monday, Tuesday, Wednesday, Thursday, and Friday, at the second hour, in Room 117, Folwell Hall. Abbreviations for class hours and buildings are interpreted by the following tables:

CLASS HOUR SCHEDULE

	Minneapolis Campus	University Farm
I Hour	8:00- 8:50	7:45- 8:35
II Hour	9:00- 9:50	8:45- 9:35
III Hour	10:00-10:50	9:45-10:35
IV Hour	11:00-11:50	10:45-11:35
V Hour	12:00-12:50	11:45-12:35
VI Hour	1:00- 1:50	1:00- 1:50
VII Hour	2:00- 2:50	2:00- 2:50
VIII Hour	3:00- 3:50	3:00- 3:50
IX Hour	4:00- 4:50	4:00- 4:50
X Hour	5:00- 5:50	5:00- 5:50

Convocation, IV hour, Thursday

(See Official Daily Bulletin for announcements)

KEY TO ABBREVIATIONS USED FOR BUILDINGS

Minneapolis Campus Buildings

A, Armory
Adm, Administration Bldg
Bo, Botany Bldg
BoG, Botany Greenhouse
Bu, Burton Hall
C, Chemistry Bldg
CCS, Center for Continuation Study
CH, Cooke Hall
CI, Cancer Institute
CWI, Child Welfare Institute
E, Main Engineering Bldg
EdH, Eddy Hall
EE, Electrical Engineering Bldg
EH, Eustis Hospital
EMH, Elliot Memorial Hospital
Ex, Experimental Engineering Bldg
F, Folwell Hall
FdH, Field House
G, Greenhouse
HS, Health Service
IA, Institute of Anatomy
J, Jones Hall
L, Law Bldg
Lib, Library Bldg
M, Mines Bldg
ME, Mechanical Engineering Bldg
MeS, Medical Sciences Bldg
MEx, Mines Experiment Station
MGH, Minneapolis General Hospital
MH, Millard Hall
MiU, Minnesota Union
Mu, Music Bldg
NMA, Northrop Memorial Auditorium
O, Observatory
OSL, Oak Street Laboratories
P, Pillsbury Hall
Ph, Physics Bldg
Phm, Pharmacy Bldg
PiH, Pioneer Hall
PoH, Louise M. Powell Hall
Psy, Psychology Bldg
Pt, Pattee Hall
S, Stadium
SaH, Sanford Hall
SBH, State Board of Health Bldg
ShH, Shevlin Hall
TM, Todd Memorial Hospital
UD, University Dispensary
UHS, University High School
VH, Vincent Hall
WeH, Wesbrook Hall
WGm, Women's Gymnasium
Z, Zoology Bldg

University Farm Buildings

Ad, Administration Bldg
Ag, Agronomy Bldg
En, Engineering Bldg
GH, Green Hall
HE, Home Economics Bldg
HH, Haecker Hall
Hr, Horticulture
HS, Health Service
MB, Music Bldg
OD, Old Dairy Hall
PP, Plant Pathology and Botany
SnH, Snyder Hall
So, Soils Bldg
St, Stock Pavilion
Ve, Veterinary

REQUESTS FOR INFORMATION

Correspondence with reference to the Summer Session and requests for circulars and additional information may be addressed to the Director of the Summer Session or to the Registrar, University of Minnesota, Minneapolis, Minnesota.

GRADUATE SCHOOL

The Graduate School gathers into a single organization and unites for the purpose of administration all the activities of the University in all its schools and colleges in so far as they relate to advanced instruction offered for the second or higher degrees, namely, master of arts, master of science, electrical engineer, mechanical engineer, civil engineer, chemical engineer, and doctor of philosophy. The privileges of this school are in general open to all who have received Bachelor's degrees from creditable colleges and universities, based on courses substantially equivalent to those at this University. *Students who do not hold a degree from the University of Minnesota must present a transcript in duplicate of their undergraduate work.*

Students graduating from teachers colleges who expect to register in the Graduate School should file their applications for admission and the transcripts of their undergraduate records in duplicate in the Graduate School office at least two weeks before presenting themselves for registration.

Students graduating from institutions granting the Bachelor's degree for a narrow concentration on technical and professional courses unsupported by some basic training in the subject-matter as represented in a standard or traditional college of arts and sciences will not be matriculated until they meet the requirements for an undergraduate major in one such department or the undergraduate minor in two such departments at the University of Minnesota. Students who must occupy more than one-half their time in any quarter in making up courses to meet the above requirement or who are deficient this proportion at the beginning of any quarter will register as special students in the undergraduate college giving the work. Such additional work of graduate character as they may be able to carry will be transferred on petition after matriculation in the Graduate School if they have secured a B grade in it. Such transfer covers course and not residence credit.

Work of graduate character done in the Summer Session of the University of Minnesota may be counted for residence credit for advanced degrees. The course work for the Master's degree may be completed in four separate six-week summer terms, or in three full Summer Sessions. Students must complete this work within six summers. In the first case, the candidate may (by special arrangement) be permitted to carry *in absentia* thesis work to complete the equivalent of three quarters. Students working for the Master's degree in summer terms or quarters must file the subjects of their theses before the completion of the first half of the required work. Theses of Summer Session students must be completed at least four weeks before the end of the term in which they take the degree.

The Master's degree may be earned by qualified students who complete a minimum of twenty-seven quarter credits, distributed between a major and minor field, and complete a thesis and pass the usual final examinations. This procedure, called Plan A, has been the only plan at the University of Minnesota until 1936.

An alternate road to the Master's degree, called Plan B, is now open. Under Plan B candidates for the Master's degree must complete, with an

average of B, 45 quarter credits in graduate courses listed in the Graduate School Bulletin. Students must complete course work under Plan B within seven summers. At least 21, and not more than 27, credit hours should be in a single major field. At least 9 quarter credits must be in advanced courses, seminars, or independent work under faculty supervision and requiring the preparation of written reports representing the quality but not the range of the Master's thesis. Courses which offer an opportunity to meet this 9-hour requirement are marked in the Graduate School Bulletin with an asterisk (*).

The student's program shall have the approval of a major adviser or of a departmental committee acting for the major department and is subject to the review of the group committee. The intelligent planning of the student's program requires that he shall present to his adviser or the department committee a statement of all college work completed with credit.

For students electing Plan B, it is doubly important to file applications for admission and transcript in duplicate before the registration date. Otherwise delays and possible fines for late registration are almost unavoidable.

A full statement of the requirements for advanced degrees may be found in the bulletins of the Graduate School and Graduate Work in Medicine.

Students must register each summer in the Graduate School if they desire their work to be counted for an advanced degree.

All requests for information concerning graduate work, inluding admission to the Graduate School, should be addressed to the dean of the Graduate School.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

GENERAL INFORMATION

The administrative officers of this college and their offices follow:

John T. Tate, Dean of the College ..... 219 Adm. Bldg.
J. M. Thomas, Assistant Dean for the Senior College ..... 219 Folwell Hall
W. H. Bussey, Assistant Dean for the Junior College ..... 107 Folwell Hall
R. R. Shumway, Assistant Dean for Students' Work ..... 219 Adm. Bldg.

For general information, for the requirements for admission as regular or as unclassed students, for general rules and regulations, and for the requirements for degrees in the different curricula offered by the college, students should consult one of the administrative officers or the complete Bulletin of the College of Science, Literature, and the Arts.

Courses announced in the bulletin as open to "juniors and seniors" or to "juniors, seniors, and graduates" are called "Senior College Courses." They are open to sophomores under certain conditions. See the complete bulletin of the college, or consult one of the administrative officers.

Some of the numbers given in the statement of prerequisites for courses in this bulletin refer to courses listed in the bulletin of the college.

Some of the courses scheduled in this Summer Session Bulletin by the School of Business Administration, the Medical School, the Institute of Technology, and the College of Agriculture, Forestry, and Home Economics, are open to students of the College of Science, Literature, and the Arts under the same conditions that prevail during the regular college year. For information, consult one of the administrative officers of this college.

ASTRONOMY

FIRST TERM

11su. Descriptive Astronomy. (5 cred.; all; no prereq.; MTWF III-IV and one evening a week for observation; 133Ph.) Mr. Luyten.

13su. Stellar and Practical Astronomy. Deals primarily with the observational aspect of astronomy, with the constellations and individual stars. Two lectures a week and as much observing as weather permits. 3 cred.; all; no prereq.; WF 8:00 to 9:30 p.m., approximately the latter half of the time being supplanted by observation; 133Ph.) Mr. Luyten.

140su. Least Squares. (3 cred.; prereq. 51 or 11, and at least Math. 51; ar.) Mr. Luyten.

BOTANY

FIRST TERM

1su. General Botany. General survey lecture course on plant life. Fundamental facts of structure, growth, reproduction; relation of plants to each other and to their environment. (4 cred.; all; no prereq.; MTWF III, IV; 06Bo.) Mr. Huff.

2su.‡ Elementary General Morphology of Plants. 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 entire plant kingdom. (3 cred.; prereq. 1; MTWF III, IV, Th III, 1 extra hour to be arranged; 1Bo.) Mr. Moyer.

3su. Forest Botany. (1 cred.; students in agriculture and forestry; no prereq.; given at Itasca Park.) Mr. Buell.

22su.‡ Elementary Plant Physiology. An elementary study of the fundamental processes occurring in plants. This entails a study of the role of essential elements, respiration, photosynthesis, enzymes, hormones, and other growth factors. (3 cred.; all; prereq. 1 and high school chem.; lect. MF I, II, 4Bo.; lab. TWTh I, II, 104Bo.) Mr. Miller.

118su.*‡ Cytology I. Cytoplasmic Phenomena. A detailed study of the structure of protoplasm, the cell wall, and cell constituents in the light of their chemical and physical properties. (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. including 5 and an elem. course in chem.; MTWThF I, II; 202Bo.) Mr. Moyer.

140su. General Plant Physiology. Advanced survey lecture course of the whole field of plant physiology. (3 cred.; jr., sr., grad.; prereq. 22 or equiv., elem. inorg. chem.; lect. MTWThF III and 2 hours supervised reading per week; 4Bo.) Mr. Miller.

209su. Research Problems on the Cell. The opportunity is provided for independent and individual research on special phases of cell structure or physiology. (3 to 5 cred.; grad.; ar.; 202Bo.) Mr. Moyer.

225su. Research Problems in Plant Physiology. Advanced studies in plant hormones, respiration, photosynthesis, and metabolism. Special problems will also be offered in spectroscopic identification and quantitative analyses of soils, pigments, vitamins, hormones, lipids, and sterols. (2 to 5 cred.; grad.; ar.; 104Bo.) Mr. Miller.

SECOND TERM

Courses To Be Given at the Forestry and Biological Station, Itasca Park

8su. Elements of Field Taxonomy. (3 cred.; prereq. Bot. 1, or consent of instructor; WS.) Mr. Buell.

11su. Field Botany. (3 cred.; no prereq.; MTh.) Mr. Buell.

* Offered instead of 119su, Cytology II, offered in 1938. Either course may be taken separately.

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

20su. Elementary Field Ecology. (3 cred.; no prereq.; MTh.) Mr. Lawrence.

62su.‡ Bryophytes and Pteridophytes. (3 cred.; jr., sr.; prereq. 10 cred. or consent of instructor; TF.) Mr. Rosendahl.

115su. Advanced Taxonomy of Flowering Plants. (3 cred.; prereq. 10 cred. incl. 7; WS.) Mr. Rosendahl.

135su.‡ Field Research Methods in Ecology. (3 cred.; prereq. 18 cred. incl. 21 or equiv.; WS.) Mr. Lawrence.

196su. Special Problems in Ecology or Taxonomy. (Cred. ar.; adv. students.) Mr. Rosendahl, Mr. Lawrence.

For detailed description of courses offered see Forestry and Biological Station.

CLASSICS

FIRST TERM

Greek

44su.* Greek Tragedy. Lectures on the origin and development of Greek tragedy. Reading of selected plays of Aeschylus, Sophocles, and Euripides. Reports on later adaptations in modern literature. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 114F.) Mr. Ogle.

45su.* Greek Mythology. Lectures, textbook work, and illustrative readings, supplemented by occasional stereopticon views. The origin and interpretation of the myth; its relation to literature, art, and religion. 3 cred.; soph., jr., sr.; no prereq.; MTWF IV and 1 hr. ar.; 114F.) Mr. Heller.

Latin

73su. Advanced Grammar and Composition. Designed especially for teachers of Latin. (3 cred.; jr., sr.; prereq. four years of high school Latin or equiv.; MTWF IV and 1 hr. ar.; 110F.) Mr. Ogle.

141su.† Problems in the Teaching of High School Latin. Discussion and reports concerning problems in methods, textbooks, illustrative material, bibliography. Readings in Latin material suitable for the second year. (3 cred.; jr., sr., grad.; prereq. any two courses between 50 and 100; MTWThF III; 110F.) Mr. Heller.

171su. Independent Reading Course. (3 cred.; jr., sr., grad.; prereq. any two courses between 50 and 100 or six years of Latin; MTWThF II; 110F.) Mr. Heller.

201su. Graduate Seminar: Latin Comedy. (3 cred.; ar.) Mr. Ogle.

ENGLISH

FIRST TERM

Courses in English

21su. Introduction to English Literature. This course carries university credit for the first quarter of English 21-22-23. The course covers the literature of the English Renaissance from Marlowe to Milton and

* No knowledge of Greek is required for these courses.

† Carries credit only in the College of Education.

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

Bunyan. (5 cred.; all; prereq. Eng. A-B-C, or Comp. 4-5-6, or exemption from requirement; MTWThF II, MTWF IV and 1 hr. ar.; 301F.) Mr. Hessler.

33su. The Later English Novel. A study of the chief novelists of the last fifty years, including Hardy, Butler, Conrad, Galsworthy, Wells, Bennett. Lectures and class discussions. (3 cred.; all; prereq. Eng. A-B-C, or Comp. 4-5-6, or exemption from the requirement; MTWThF I; 204F.) Mr. Hillhouse.

55su. Shakespeare. The reading of *The Comedy of Errors, The Two Gentlemen of Verona, The Taming of the Shrew, The Merchant of Venice, Much Ado about Nothing, Twelfth Night,* with collateral reading. *Midsummer Night's Dream, The Tempest,* to be read independently. (3 cred.; jr., sr.; prereq.;* MTWF IV and 1 hr. ar.; 305F.) Mr. Mallam.

56su. Shakespeare. A continuation of 55su. The reading of *Richard II, Henry IV 1 and 2, Henry V, Julius Caesar, Hamlet, Macbeth,* with collateral reading. (3 cred.; jr., sr.; prereq.;* MTWThF II; 306F.) Miss Armstrong.

62su. Milton. (3 cred.; jr., sr.; prereq. 21-22 or 55-56; MTWThF I; 306F.) Mr. Dunn.

73su. American Literature. This course carries university credit for the first quarter of English 73-74. (3 cred.; jr., sr.; prereq.;* MTWThF II; 303F.) Mr. McDowell.

75su. Chaucer. Reading of tales from the Canterbury collection, with introduction dealing with the grammar and literary forms of fourteenth-century English. (3 cred.; jr., sr.; prereq.;* MTWThF III; 205F.) Mr. Ruud.

100su. Old English. Old English prose and poetry. The relation to modern English is particularly emphasized. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF I; 205F.) Mr. Ruud.

105su. Eighteenth-Century Poetry. Pope and his contemporaries. This course carries university credit for the first quarter of English 105-106. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF II; 204F.) Mr. McKillop.

107su. Eighteenth-Century Prose. The Queen Anne periodical. This course carries university credit for the first quarter of English 107-108. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWF IV and 1 hr. ar.; 204F.) Mr. McKillop.

110su. Romantic Poets. The romantic poets of the nineteenth century (Byron, Shelley, Keats). This course carries university credit for the second quarter of English 109-110. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF II; 305F.) Miss Jackson.

111su. Seventeenth-Century Prose. General survey of the prose of the century to 1660. This course carries university credit for the first quarter of English 111-112. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF III; 302F.) Mr. Dunn.

* English A-B-C or Composition 4-5-6 and 6 additional credits, or 10 credits in English 21-22-23.

113su. American Short Story. A history of the short story in the United States from Washington Irving to the present day. (3 cred.; jr., sr., grad.; prereq. 73-74; MTWThF I; 303F.) Mr. McDowell.

115su. Victorian Prose. The more important prose writers of the Victorian period, including Carlyle, Newman, Ruskin, Froude, Arnold, Huxley and Pater. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWF IV and 1 hr. ar.; 205F.) Mr. Rollins.

126su. Drama, 1660-1730. This course carries university credit for the first quarter of English 126-127. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF I; 305F.) Mr. Bateson.

129su. Modern Drama. Contemporary drama from 1870 to the present. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF III; 204F.) Mr. Hillhouse.

151su. Recent Poetry. Poetry in England and America since the death of Queen Victoria. The main tradition and tendencies now prevailing. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWF IV and Th V; 303F.) Miss Jackson.

157su. Elizabethan Non-Dramatic Literature. A survey of prose and poetry, 1558-1603. (3 cred.; jr., sr., grad.; prereq 6 cred. above 50; MTWThF II; 205F.) Mr. Rollins.

167su. English Literary Criticism. A historical sketch, with special reference to Aristotle, Sir Philip Sidney, Dryden, Dr. Johnson. This course carries university credit for the first quarter of English 167-168. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF III; 303F.) Mr. Bateson.

FIRST TERM

Courses in Composition

4su. Freshman Composition. Practical training in the art of writing; the principles of structure, and analysis of specimens of good prose. This course carries university credit for the first quarter of Comp. 4-5-6. (3 cred.; all; prereq. placement test; MTWThF I; 302F.) Mr. Briggs.

6su. Freshman Composition. A continuation of Composition 5. This course carries university credit for the third quarter of Composition 4-5-6. (3 cred.; all; prereq. Comp. 4-5; MTWThF II; 302F.) Mr. Briggs.

27su. Advanced Writing. The writing of essays with emphasis on structure and organization. Instruction largely in individual conference. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThF III; 304F.) Miss Armstrong.

28su. Advanced Writing. Informal writing, involving description and narration. Instruction largely in individual conference. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThF II; 304F.) Mr. Mallam.

SECOND TERM

Courses in English

55su. Shakespeare. The reading of *The Comedy of Errors, The Two Gentlemen of Verona, The Taming of the Shrew, The Merchant of Venice, Much Ado about Nothing, Twelfth Night,* with collateral reading.

Midsummer Night's Dream, The Tempest, to be read independently. (3 cred.; jr., sr.; prereq.;* MTWThF III; 205F.) Mr. Clark.

74su. American Literature. This course carries university credit for the second quarter of English 73-74. (3 cred.; jr., sr.; prereq.;* MTWThF II; 204F.) Mr. Flanagan.

109su. Romantic Poets. The romantic poets of the nineteenth century (Wordsworth, Coleridge, Scott). This course carries university credit for the first quarter of English 109-110. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF III; 303F.) Mr. Nichols.

127su. Drama, 1730-1880. This course carries university credit for the second quarter of English 126-127. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF II; 303F.) Mr. Bateson.

156su. The American Drama. A survey of American drama in the eighteenth and nineteenth centuries. (3 cred.; jr., sr., grad.; prereq. 73-74 and 6 cred. above 50; MTWThF I; 303F.) Mr. Nichols.

168su. English Literary Criticism. A historical sketch, with special reference to Coleridge, Arnold, T. S. Eliot. This course carries university credit for the second quarter of English 167-168. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWF IV and 1 hr. ar.; 303F.) Mr. Bateson.

SECOND TERM

Courses in Composition

5su. Freshman Composition. A continuation of Composition 4. This course carries university credit for the second quarter of Composition 4-5-6. (3 cred.; all; prereq., Comp. 4; MTWThF II; 302F.) Mr. Clark.

6su. Freshman Composition. A continuation of Composition 5. This course carries university credit for the third quarter of Composition 4-5-6. (3 cred.; all; prereq. Comp. 4-5; MTWF IV and 1 hr. ar.; 302F.) Mr. Flanagan.

28su. Advanced Writing. Informal writing, involving description and narration. Instruction largely in individual conference. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThF III; 304F.) Mrs. Phelan.

29su. Advanced Writing. The nature of the writing is left as far as possible to the choice of the students. The instructor will divide the class into several groups according to the types of writing students wish to do. (3 cred.; all; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWF IV and 1 hr. ar.; 304F.) Mrs. Phelan.

FINE ARTS

FIRST TERM

72su. Modern Mexican Art. A study of Mexican painting from the Revolution to the present time—the murals of Rivera and Orozco and their relation with modern politics and art in America and Europe; the re-

* English A-B-C or Composition 4-5-6 and 6 additional credits, or 10 credits in English 21-22-23.

birth of the Renaissance fresco; and the significance of Mexico as a source of modern art. (3 cred.; prereq. one college course in art history, or consent of instructor; MTWThF II; 2J.) Mr. Schmeckebier.

101su. Northern Painting of the Renaissance. Painting in Flanders, northern France, and Germany from the Van Eycks to Dürer and Holbein; with the study of reproductions in university collections and trips to the Minneapolis Institute of Art. (3 cred.; jr., sr., grad.; prereq. one college course in art history, or consent of instructor; MTWF IV and 1 hr ar.; 2J.) Mr. Schmeckebier.

GEOGRAPHY

FIRST TERM

11su. Human Geography. A study of the factors of the physical environment and their effect on human activities. (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; MTWThF I-II; 103Bu.) Mr. Davis.

41su. Geography of Commercial Production. A study of the major commodities which enter into world trade and the geographic basis for their production. (5 cred.; soph., jr., sr.; no prereq., 11 recommended; MTWF III-IV, Th III and 1 hr. ar.; 103Bu.) Mr. Whitaker.

53su. Historical Geography of North America. A study of the geography of past periods of American history. (3 cred.; jr., sr.; prereq. 11, or 15 cred. in hist.; MTWThF I; 105Bu.) Mr. Brown.

71su. Geography of North America. A consideration of environmental conditions and their limiting effect on economic activities in the major geographic regions of the United States and Canada. (3 cred.; jr., sr.; prereq. 11; MTWThF III; 105Bu.) Mr. Dicken.

101su. Geography of Europe. A study of the major geographic regions of Europe with particular emphasis on economic activities and urban development. (3 cred.; jr., sr., grad.; prereq. 8 cred.; MTWF IV and 1 hr. ar.; 105Bu.) Mr. Dicken.

110su. Geography of South America. A study of type areas in South America as illustrative of conditions in the major geographic regions of the continent. (3 cred.; jr., sr., grad.; prereq. 8 cred.; MTWThF II; 105Bu.) Mr. Brown.

SECOND TERM

41su. Geography of Commercial Production. A study of the major commodities which enter into world trade and the geographic basis for their production. (5 cred.; soph., jr., sr.; no prereq., 11 recommended; MTWThF I-II; 103Bu.) Mr. Dicken.

GEOLOGY

FIRST TERM

1su. General Geology. (Dynamic processes and their results.) A study of minerals, rocks, structures, and earth processes. Lectures supplemented by laboratory work and field excursions. (5 cred.; all; no prereq.; MTWThF I-II; 110P.) Mr. Stauffer.

GERMAN

FIRST TERM

1su. Beginning A. (5 cred.; all; no prereq.; MTWThF I-II; 209½F.) Mr. Downs.

4su. Intermediate German. (5 cred.; all; prereq. 3 or three years high school German; MTWThF I-II; 207F.) Mr. Pfeiffer.

68su. Survey of German Literature. (3 cred.; jr., sr.; prereq. 6 cred. above 40; MWF I-II; 209F.) Mr. Reichardt.

118su. Germanic Heroic Poetry. (3 cred.; sr., grad.; prereq. 68 and 9 cred. above 60; TTh I-II; 209F.) Mr. Reichardt.

173su. Thomas Mann. (3 cred.; sr., grad.; prereq. 122 and 11 cred. above 60; MW III-IV; 212F.) Mr. Pfeiffer.

SECOND TERM

2su. Beginning B. (5 cred.; all; prereq. 1 or one year high school German; MTWThF I-II; 209½F.) Mr. Meessen.

HISTORY

FIRST TERM

1su. European Civilization. Part I of freshman survey, from fall of the Roman Empire to the French Revolution. (5 cred.; all; no prereq.; MTWThF I-II; 211Bu.) Mr. Loehr.

8su. American History. Part II of the general survey. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 221Bu.) Mr. Shippee.

52su. Greek History. Alexander and the Hellenistic Age. (3 cred.; soph. with permission of instructor, jr., sr.; no prereq.; MTWThF III; 112Bu.) Mr. Jones.

61su. Europe after 1870. (3 cred.; jr., sr.; no prereq.; MTWThF II; 112Bu.) Mr. Deutsch.

67su. Recent American History. From Reconstruction to 1900. (3 cred.; jr., sr.; no prereq.; MTWThF III; 221Bu.) Mr. Stephenson.

70su. English Constitutional History. Survey of legal and political institutions. This course is designed in condensed form to meet the prelegal requirement and will be accepted by the Law School as satisfying its requirements from those who are unable to present the regularly prescribed course. (5 cred.; prelegal soph. with at least C average in Hist. 4-5-6 or Hist. 1-2; jr., sr.; no prereq.; MTWThF I-II; 109F.) Mr. Ross.

88su. American Colonies in the 18th Century. (3 cred.; jr., sr.; no prereq.; MTWThF II; 209Bu.) Mr. Osgood.

90asu. Minnesota and the Northwest. (3 cred.; jr., sr.; no prereq.; MTWThF I; 221Bu.) Mr. Blegen.

157su. Readings in Modern European History. Europe after 1870. (3 cred.; sr., grad.; prereq. attend and do work of Hist. 61su, but register only for 157su; MTh VII-VIII; 112Bu.) Mr. Deutsch.

190su. Readings in American History. United States in forties and fifties. (3 cred.; sr., grad.; prereq. college course in American history survey; MTh VII-VIII; 211Bu.) Mr. Shippee.

191su. Readings in American History. American West. (3 cred.; sr., grad.; prereq. see 190su; TF VII-VIII; 112Bu.) Mr. Osgood.

192su. Readings in American History: Political Leaders, 1865-1900. (3 cred.; sr., grad.; prereq. see 190su; TF VII-VIII; 111Bu.) Mr. Stephenson.

201-202-203su. Bibliography and Criticism. Required of all candidates for advanced degrees in history when equivalent not taken elsewhere. (3 cred.; grad.; prereq. history as major field; MTWF IV, Th VII; 221Bu.) Mr. Jones.

SECOND TERM

9su. American History. Part III of survey course. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 211Bu.) Mrs. Tyler.

66su. Europe after 1918. (3 cred.; jr., sr.; no prereq.; MTWThF I; 112Bu.) Mr. Deutsch.

75su. England in the 19th Century. (3 cred.; jr., sr.; no prereq.; MTWThF II; 112Bu.) Mr. Willson.

97asu. Rise of American Industrial Civilization. (3 cred.; jr., sr.; no prereq.; MTWThF II; 221Bu.) Mr. Gates.

158su. Readings in Modern European History. (3 cred.; sr., grad.; prereq. attend and do work of 66su but register only for 158su; MTh VII-VIII; 112Bu.) Mr. Deutsch.

170su. Readings in English History. English voyages of discovery and commercial expansion under the Tudors. (3 cred.; sr., grad.; prereq. survey course in English or general European history; TF VII-VIII; 112Bu.) Mr. Willson.

191su. Readings in American History: The Civil War. (3 cred.; sr., grad.; prereq. survey course in American history; MTh VII-VIII; 111Bu.) Mrs. Tyler.

192su. Readings in American History: Economic and Social United States. (3 cred.; sr., grad.; prereq. see 191su; TF VII-VIII; 111Bu.) Mr. Gates.

JOURNALISM

Fees.—Students registered for any journalism course are required to pay a general fee of $1 a quarter, regardless of the number of courses pursued. Course 55su requires a laboratory fee in addition to the general fee of $1.

FIRST TERM

11su. Newswriting and Editing. Lectures, practice, and conferences. Practical instruction in news gathering, journalistic writing, copy editing, headline writing, and make-up. For majors and nonmajors. (3 cred.; soph., jr., sr.; no prereq.; MTWThF III; 14P.) Mr. Nafziger.

55su.‡ Advertising and Newspaper Typography. Lectures and laboratory work designed to teach the student how to work with type, how to pre-

‡ A laboratory fee of $3 is charged for this course.

pare layouts, how to handle headline forms, copy blocks, illustrations, borders, type devices, and other make-up problems. Printing and engraving processes. A brief historical survey of the development of printing. (3 cred.; jr., sr.; prereq. 11 or 15; lect. TTh VI, lab. MWF VI; 20P.) Mr. Barnhart.

69su. Newspaper and Magazine Articles. Lectures and conferences. Practice in production of nonfiction articles for periodicals, general and specialized, and newspapers; instruction in magazine editing. (3 cred.; jr., sr.; prereq. 11, 15, or 41 or consent of instructor; MTWThF II; 10P.) Mr. Thackrey.

82su. Supervision of School Publications. A practical consideration of problems facing supervisors of high school newspapers, magazines, and yearbooks. (3 cred.; jr., sr.; prereq. consent of instructor; MTWThF I; 14P.) Mr. Barnhart.

103su. Literary Aspects of Journalism. A study of the best journalistic work of such writers as Daniel Defoe, Benjamin Franklin, Mark Twain, Walt Whitman, Lafcadio Hearn, Rudyard Kipling, O. Henry, etc. Lectures and outside readings. (3 cred.; jr., sr., grad.; prereq. Eng. 21-22 or 22-23 or instructor's consent; MTWThF III; 10P.) Mr. Ford.

113su. The Press and Foreign Affairs. An appraisal of the relationship between international amity and the reporting and interpretation of world news by the American and foreign press. A study of the channels of international news communication and the great press associations. (3 cred.; jr., sr., grad.; no prereq.; MTWF IV and 1 hr. ar.; 10P.) Mr. Nafziger.

116su. Representative American Newspapers, 1900-1936. Twentieth-century tendencies and movements in American journalism considered in historical perspective and with special reference to leading metropolitan newspapers. (3 cred.; jr., sr., grad.; 9 hrs. of soc. sci. or consent of instructor; not open to students who have received credit in Jour. 110; MTWThF II; 14P.) Mr. Ford.

210su. Research in Newspaper Problems. Individual research in either historical or contemporary phases of newspaper, periodical, or advertising fields. (2 to 3 cred.; seminar for graduate students; prereq. consent of department; hrs. ar.) Mr. Nafziger.

SECOND TERM

133su. Propaganda and Censorship in the Modern World. Propaganda activities of governments, economic groups, political parties, and others seeking to control mass behavior by symbolic stimuli. Analysis of censorship controls. (3 cred.; jr., sr., grad.; no prereq.; MTWThF III; 10P.) Mr. Thackrey.

MATHEMATICS

FIRST TERM

1su. Higher Algebra. A collegiate treatment of the topics of elementary algebra for those who have had one year of elementary algebra. (5 cred.; all; prereq. 1 yr. of elementary algebra in high school; open for

credit to any student offering less than one year of *advanced* high school algebra for entrance credit; MTWThF I-II, and two other periods to be arranged; 105F.) Miss Martin.

6su. Trigonometry. A treatment of logarithms and plane trigonometry. (5 cred.; all; prereq. 1 or high school higher algebra; open for credit to students offering high school trigonometry for entrance; MTWThF I-II; 102F.) Mr. McEwen.

7su. College Algebra. Selected topics in algebra commencing with quadratic equations and extending through the theory of equations and determinants, omitting logarithms. (5 cred.; all; prereq. 1 or high school higher algebra; MTWF III-IV, Th III-V; 105F.) Mr. Campaigne.

20su. Mathematics of Investment. The principles and applications of the theory of interest, annuities, amortization, valuation of bonds, sinking funds, and depreciation. (5 cred.; all; prereq. 8, or 6 and 7; MTWF III-IV, Th III-V; 104F.) Mr. Koehler.

30su. Analytic Geometry. (5 cred.; all; prereq. 6 and 7 or 6 and 8; MTWThF I-II; 104F.) Mr. Wegner.

50su. Calculus I. Differential calculus. (5 cred.; jr., sr.; prereq. 30; MTWThF I-II; 125F.) Miss Gibbens, Mr. Campaigne.

90su. Selected Topics in Senior College Mathematics. A course open to properly qualified sophomores, juniors, and seniors, who will be guided through conferences in the study of assigned topics. (Cred. ar.;* jr., sr.; prereq. 30; ar.) Mr. Wegner.

105su. Intermediate Calculus. Advanced topics in differential and integral calculus. This course, together with 106, is satisfactory as a prerequisite for 107. (3 cred.; jr., sr., grad.; prereq. 9 cred. in elementary calculus; MTWThF I; 101F.) Mr. Underhill.

106su. Differential Equations. A first course in differential equations with emphasis on their applications in physics and geometry. (3 cred.; jr., sr., grad.; prereq. 51; MTWThF III; 101F.) Mr. Underhill.

110su. Selected Topics in Advanced Mathematics. An intensive course open to juniors, seniors, and graduates who will be guided through conferences in the study of assigned topics. In particular, the content of advanced calculus will be available for properly prepared students. (Cred. ar.;* jr., sr., grad.; prereq. 51; ar.) Mr. Jackson, Mr. Underhill.

118su. Vector Analysis. The laws of algebraic combination of vectors; geometrical and physical applications; vector differential operators. (3 cred.; jr., sr., grad.; prereq. 51; MTWF IV, Th V; 101F.) Mr. Jackson.

122su. Introduction to the Theory of Probability. Fundamental principles of probability; the binomial distribution; the normal frequency curve; introduction to the theory of sampling. (3 cred.; jr., sr., grad.; prereq. 51; MTWThF II; 101F.) Mr. Jackson.

137su. Advanced Theory of Equations. Determinants, symmetric functions, and other advanced topics in the theory of equations. (3 cred.; jr., sr., grad.; prereq. 51 and 62; MTWF IV, Th V; 102F.) Miss Gibbens.

* The number of credits is one or more according to the amount of work to be done.

SECOND TERM

6su. Trigonometry. A treatment of logarithms and plane trigonometry. (5 cred.; all; prereq. 1 or high school higher algebra; MTWThF I-II; 105F.) Mr. Swanson.

51su. Calculus II. Integral calculus. (5 cred.; jr., sr.; prereq. 50; MTWF III-IV, Th III-V; 104F.) Mr. Wegner, Mr. Swanson.

90su. Selected Topics in Senior College Mathematics. See description under first term. Miss Carlson, Mr. Wegner.

110su. Selected Topics in Advanced Mathematics. See description under first term. Miss Carlson.

MUSIC

FIRST TERM

1su. Ear Training. (2 cred.; all; no prereq.; MTWTh II; 103Mu.) Mr. Jennings.

4su. Harmony. (3 cred.; all; no prereq.; MTWF IV; 103Mu.) Mr. Scott.

11su. Piano. Two lessons a week. Fee $25. (2 cred.; ar.; Mu.) Mr. Lindsay, Mr. Stephens.

12su. Voice. Two lessons a week. Fee $25. (2 cred.; ar.; Mu.) Mr. Killeen, Mrs. Snyder.

13su. Violin. Two lessons a week. Fee $25. (2 cred.; ar.; Mu.) Mr. Peterson, Mr. Scheurer.

14-26su. Instruments of the Orchestra. Two lessons a week. Fee $25. (2 cred.; ar.; Mu.) Ar.

27su. Organ. Two lessons a week. Fee $25. (2 cred.; ar.; Mu.) Mr. Jennings.

34su. History of Music. (2 cred.; no prereq.; MTWThF III; 103Mu.) Mr. Ferguson.

37su. Keyboard Harmony. (1 cred.; prereq. Mu. 4, 5; T IV and 1 hr. ar.; 104Mu.) Mr. Jennings.

40su. Orchestra. (1 cred.; no prereq.; M IX,X; Mu.Aud.) Mr. Pepinsky.

43su. Chorus. (1 cred.; no prereq.; Tues. 7:00-9:00 p.m.; 5NMA.) (The summer chorus will present *Samson and Delilah,* and rehearsal for this opera will constitute the work for the summer.) Mr. Killeen.

59su. Technique of Voice. (2 cred.; no prereq.; MTWThF VII; 103Mu.) Mr. Killeen.

76su. Form and Analysis. (3 cred.; jr., sr.; prereq. Mu. 4, 5, and Psy. 1, 2; MTWThF VI; 103Mu.) Mr. Pfitzner.

93su. Music for Two Pianos. Compositions written for two pianos. (2 cred.; advanced students only; class limited to 12 members; MTWTh VII; 104Mu.) Mr. Scott.

200su. Basis of Musical Expression. (3 cred.; open only to grad.; MWF VIII-IX; Mu.) Mr. Ferguson.

205su. Composition in Larger Forms. (3 cred.; open only to grad.; ar.; Mu.) Mr. Ferguson.

210su. Advanced Topics in Musical Analysis. (3 cred.; open only to grad.; ar.; Mu.) Mr. Pepinsky.

SECOND TERM

211su. Advanced Topics in Musical Analysis. (3 cred.; open only to grad.; ar.; Mu.) Mr. Pepinsky.

PHILOSOPHY

FIRST TERM

1su. Problems of Philosophy. An introduction to philosophy. Topics include the history of philosophical thought; the philosophy of religion; the nature and existence of God; immortality; the nature of reality; theories of truth and methods of knowledge; the philosophy of science; the theory of evolution; social and political philosophies. (3 cred.; soph., jr., sr.; no prereq.; MTWThF III; 322F.) Mr. Castell.

2su. Logic. A study of the difference between logical and fallacious reasoning; types of fallacies; the rules of a good definition; syllogisms; what constitutes proof; hypothesis; generalization; probability; scientific thinking; evolution of intelligence; the struggle of scientific against unscientific modes of thinking as exemplified in the history of civilization. (3 cred.; soph., jr., sr.; no prereq.; MTWF IV and 1 hr. ar.; 322F.) Mr. Castell.

3su. Ethics. Problems of life treated 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. (3 cred.; soph., jr., sr.; no prereq.; MTWThF I; 322F.) Mr. Everett.

20su. Social Philosophy. A study of conflicting social philosophies of today; liberalism versus authoritarianism; evaluation of various social, politic, and economic institutions in terms of ethical ideals; other problems of social morality; social reconstruction; social utopias. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 322F.) Mr. Everett.

PHYSICS

FIRST TERM

1-2-3su. Introduction to Physical Science, Part I. Lectures and experimental demonstrations. (4½ cred.; all; prereq. high school algebra and plane geometry; lect. MWThF I,II, T I; 166Ph.) Mr. Buchta.

1a-2a-3asu.‡‡ Introduction to Physical Science, Part I. Laboratory included. Fulfills group requirements in Science, Literature, and the Arts. (6 cred.; all; prereq. high school algebra and plane geometry; lect. MWThF I,II, T I, 166Ph.; lab. TTh VI-VIII, 153Ph.) Mr. Buchta.

4su.‡ General Physics. Part I. (Primarily for premedical students.) Mechanics and heat. Laboratory included. (5 cred.; all; prereq. higher algebra and trigonometry; lect. and quiz MTWF III,IV, Th III, 166Ph.; lab. MW VI,VII, 153Ph.) Mr. Williams.

‡ A fee of $2 is charged for this course.
‡‡ A fee of $3 is charged for this course.

5su.‡ General Physics, Part II. (Primarily for premedical students.) Electricity and modern physics. Laboratory included. (5 cred.; all; prereq. 4 or equiv.; lect. and quiz MTWF I,II, Th I, 133Ph.; lab. MW VIII,IX, 231Ph.) Mr. Hill.

7su.‡ General Physics, Part I. (Primarily for students in the Institute of Technology and those majoring in physics, mathematics, or chemistry.) Mechanics and heat. Laboratory included. (5 cred.; all; prereq. higher algebra and trigonometry; lect. and quiz MTWF III,IV, Th III, 166Ph.; lab. MW VI-VII, 153Ph.) Mr. Williams.

8su.‡ General Physics, Part II. (Primarily for students in the Institute of Technology and those majoring in physics, mathematics, or chemistry.) Electricity and modern physics. Laboratory included. (5 cred.; all; prereq. 7 or equiv.; lect. and quiz MTWF I,II, Th I, 133Ph.; lab. MW VIII,IX, 231Ph.) Mr. Hill.

103asu. Thermodynamics. Theory and application to problems in physics. (3 cred.; jr., sr., grad.; prereq. a general course in physics, Math. 51; MTWThF III; 145Ph.) Mr. Buchta.

105asu. Electrostatics. Direct currents. (3 cred.; jr., sr., grad.; prereq. a general course in physics, Math. 51; MTWThF VI; 145Ph.) Mr. Hill.

107bsu. Modern Physics. Lectures and readings on selected topics in contemporary fields of research. (3 cred.; jr., sr., grad.; prereq. a general course in physics, Math. 51; MTWThF I; 145Ph). Mr. Williams.

114su. Elementary Physical Investigation. The experimental or theoretical study of physical phenomena, the nature or laws of which are not as yet fully understood. (3 cred.; jr., sr., grad.; prereq. 144, Math. 51; ar.) Mr. Buchta, Mr. Hill, Mr. Williams.

SECOND TERM

1-2-3su. Introduction to Physical Science, Part II. Lectures and experimental demonstrations. (4½ cred.; all; prereq. 1-2-3su, Part I or equiv.; lect. MWThF I,II, T I; 166Ph.) Mr. Bardeen.

1a-2a-3asu.‡‡ Introduction to Physical Science, Part II. Laboratory included. Fulfills group requirements in Science, Literature, and the Arts. 6 cred.; all; prereq. 1a-2a-3asu Part I or equiv.; lect. MWThF I,II, T I, 166Ph.; lab. TTh VI-VIII, 153Ph.) Mr. Bardeen.

5su.‡ General Physics, Part II. (Primarily for premedical students.) Electricity and modern physics. Laboratory included. (5 cred.; all; prereq. 4 or equiv.; lect. and quiz MTWF, III,IV, Th III, 166Ph.; lab. MW VI,VII, 231Ph.) Mr. Rumbaugh.

6su.‡ General Physics, Part III. (Primarily for premedical students.) Optics and acoustics. Laboratory included. (5 cred.; all; prereq. 5 or equiv.; lect. and quiz MTWF I,II, Th I, 133Ph.; lab. MW VIII,IX, 352Ph.) Mr. Miller.

8su.‡ General Physics, Part II. (Primarily for students in the Institute of Technology and those majoring in physics, mathematics, or chemistry.)

‡ A fee of $2 is charged for this course.
‡‡ A fee of $3 is charged for this course.

Electricity and modern physics. Laboratory included. (5 cred.; all; prereq. 7 or equiv.; lect. and quiz MTWF III,IV, Th III, 166Ph.; lab. MW VI-VII, 231Ph.) Mr. Rumbaugh.

9su.‡ General Physics, Part III. (Primarily for students in the Institute of Technology and those majoring in physics, mathematics, or chemistry.) Optics and acoustics. Laboratory included. (5 cred.; all; prereq. 8 or equiv.; lect. and quiz MTWF I,II, Th I, 133Ph; lab. MW VIII,IX, 352Ph.) Mr. Miller.

29su. Introduction to Meteorology. A presentation of the fundamental principles underlying meteorological phenomena, accompanied by instrumental observation and weather map study. (3 cred.; all; prereq. high school physics or equiv.; MTWThF III, quiz W IX or ar.; 133Ph.) Mr. Miller.

105bsu. Electrodynamics and A. C. Circuits. (3 cred.; jr., sr., grad.; prereq., a general course in physics, Math. 51; MTWThF VI; 145Ph.) Mr. Bardeen.

116su. Elementary Physical Investigation. The experimental or theoretical study of physical phenomena, the nature or laws of which are not as yet fully understood. (3 cred.; jr., sr., grad.; prereq. 144, Math. 51; ar.) Mr. Miller, Mr. Bardeen, Mr. Rumbaugh.

126su.‡ Advanced Heat. (3 cred.; jr., sr., grad.; prereq., a general course in physics, Math. 51; MWF VI-IX; 245Ph.) Mr. Miller.

144su.‡ Electrical Measurements. (3 cred.; jr., sr., grad.; prereq. 8 or equiv.; lect. and quiz MWF I; lab. TTh VI-IX, 231Ph.) Mr. Rumbaugh.

POLITICAL SCIENCE

FIRST TERM

1su. American Government and Politics. (Part 1 of Political Science 1-2.) The historical development of American political institutions; general organization and structure of American government at all levels; nature and growth of the Constitution; citizenship and private rights; parties; public opinion; nominations and elections. (3 cred.; all; no prereq.; MTWThF I; 111Bu.) Mr. Kirkpatrick.

2su. American Government and Politics. (Part 2 of Political Science 1-2.) An examination of the constitutional position of legislative bodies in the United States; their powers and procedure; the office of the American executive; administrative organization and problems; the civil service; the role and function of the courts. (3 cred.; all; prereq. 1 or consent of instructor; MTWThF III; 211Bu.) Mr. McLaughlin.

25su. World Politics. An introduction to the field of contemporary international relations; the policies of the great powers today; nationalism; armaments; alliances; internationalism. (3 cred.; soph., jr., sr.; no prereq.; MTWThF III; 209Bu.) Mr. Mills.

108su. Legislative Organization and Procedure. A study of the structure and functioning of legislative bodies, including such topics bicameralism, the committee system, party leadership, the caucus, parliamentary

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

procedure, limitations on debate, legislative councils, bill drafting bureaus, and reference services. (2 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWF IV; 211Bu.) Mr. Short.

121su. Municipal Administration. Forms of administrative organization; personnel; purchasing; budgeting, accounting, and reporting; records and accounts; finance. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF II; 314Lib.) Mr. Ludwig.

161su. Recent Political Thought. Recent and present schools of political thought compared; ideas concerning sovereignty and liberty, state functions, representative government, and democracy. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF III; 111Bu.) Mr. Kirkpatrick.

184su. International Organization. The structure of the older international community and of the League of Nations; procedure in the formation of international policy; international legislation and administration; the settlement of international disputes; sanctions. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF I; 209Bu.) Mr. McLaughlin.

197su. American and European Colonies Today. Imperialism in practice in the modern world; policies and forms of government; native nationalism in the Philippines and other colonies; relation between colonial expansion and world peace. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF II; 111Bu.) Mr. Mills.

201su. Seminar in American Government, Politics, and Administration. (2 cred.; grad., and sr. with consent of instructor; ar.; first meeting 12:00 noon first day of classes; 209Bu.) Mr. Short.

SECOND TERM

3su. American Government and Politics. (Part 3 of Political Science 1-2-3.) Principal functions and services of government; defense, law enforcement, regulation of business, public works, and social services. (3 cred.; all; no prereq.; MTWThF I; 211Bu.) Mr. Christensen.

71su. Recent Social Legislation. A survey of governmental activity in the field of social welfare and social security legislation; underlying principles and theory; the development of plans of social insurance abroad and in the United States; constitutional and administrative problems; a critical examination of the Social Security Act and the state laws adopted pursuant thereto. (3 cred.; jr., sr.; prereq. 9 cred. or consent of instructor; MTWThF II; 111Bu.) Mr. Christensen.

135su. Government in Minnesota. A study of the executive, legislative, and judicial branches of the government of Minnesota; special attention to problems of finance and the new services of government, state and local. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF II; 209Bu.) Mr. Field.

144su. American Political Parties. The policies, composition, organization, activities, and functions of the political parties of today; suffrage, elections, and related subjects; evaluation of the political party as a force

in American government. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF III; 221Bu.) Mr. Starr.

148su. European Dictatorships. Description and evaluation of contemporary absolute government, especially in Soviet Russia, Italy, and Germany; organization and policies of dominant parties. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF I; 221Bu.) Mr. Starr.

163su. American Political Ideas. A discussion of the major political ideas that have developed in various periods of American history, with an analysis of the theories of some of their leading exponents and a consideration of the social, religious, economic, and political backgrounds of the writers and their ideas. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWF IV and 1 hr. ar.; 221Bu.) Mr. Field.

202su. Seminar in American Government, Politics, and Administration. (2 cred.; grad., and sr. with consent of instructor; ar.; first meeting 12:00 noon first day of classes; 209Bu.) Mr. Field, Mr. Starr.

PSYCHOLOGY

FIRST TERM

1-2su. General Psychology. An introductory survey of psychology; its material, fundamental laws, applications, and relations to other sciences. (6 cred.; soph., jr., sr.; no prereq.; MTWThF III, MTWF IV, Th V; 211Psy.) Mr. Heron.

3su. Psychology Applied to Daily Life. The applications of psychology to selected problems in medicine, law, education, sociology, and daily life. (3 cred.; soph., jr., sr.; prereq. gen. psy.; MTWF IV, Th V; 115Psy.) Mr. Longstaff.

106su. Psychology of Vocational Interests and Aptitudes. Analysis of jobs and occupations on the one hand and aptitudes, skills, and interests of men on the other hand; and use of such information in vocational selection and guidance. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF II; 1VH.) Mr. Strong.

109su.* Psychology of Individual Differences. Quantitative study of sex, race, physical traits, physical condition, family heredity, environment, and maturity in the causation of individual differences. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF III; 115Psy.) Mr. Strong.

116su. The Psychology of Literature. Fundamental processes involved in the creation and enjoyment of literary works. Descriptive and emotive uses of language. Psychological bases of style; nature and function of metaphor; techniques of humor; etc. Unconscious language processes and their use in the production of literary effects. Modern trends in the use of literary materials and devices. (3 cred.; jr., sr., grad.; prereq. gen. psy. and consent of instructor; MTWF IV, Th V; 109Psy.) Mr. Skinner.

136su. Psychology of Motivation and Conflict. A study of the motives which underlie normal human behavior and the forms of adjustment or

* Does not count as equivalent of 6-credit course with same title in major sequence.

maladjustment which arise when motives conflict or encounter external frustration. Parallel observations in the field of animal behavior will be considered. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF I; 115Psy.) Mr. Skinner.

160su. Psychology in Personnel Work. Psychology as applied to the selection and retention of a stabilized personnel. The standardized interview; principles and technique of employment tests; methods of judging character qualities; the rating scale; personnel classification methods. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF III; 109Psy.) Mr. Longstaff.

SECOND TERM

1-2su. General Psychology. See 1-2su under first term. (6 cred.; soph., jr., sr.; no prereq.; MTWThF III, MTWF IV, Th V; 211Psy.) Mr. Tinker.

109su.* Psychology of Individual Differences. Quantitative study of sex, race, physical traits, physical condition, family heredity, environment, and maturity in the causation of individual differences. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF I; 1VH.) Mr. Carlson.

117su. Points of View and Systems in Contemporary Psychology. A comparative study of the problems, methods, and points of view of modern psychology. This course is planned for two groups of students: (1) those who have studied psychology several years ago and wish to bring their knowledge up to date; (2) those who have taken a first year course in psychology recently and, without intending to become professional psychologists, wish to become better acquainted with such current points of view as behaviorism, psychoanalysis, Gestalt psychology, etc. (3 cred.; jr., sr., grad.; prereq. gen. psy.; MTWF IV; Th V; 115Psy.) Mr. Carlson.

144su,145su.†§ Abnormal Psychology. A survey of ideas of causation and of techniques of treating abnormal behavior from early historical times; special emphasis is put upon the care and treatment of the abnormal in America. Consideration of the various psychoses and psychoneuroses and of social problems related to them. (6 cred.; jr., sr., grad.; prereq. gen. psy.; MTWThF II-III; 115Psy.) Mr. Bird.

ROMANCE LANGUAGES

FIRST TERM

FRENCH

1su. Beginning French. Regular beginning course with special attention to the needs of those who desire a reading knowledge of French. (4 cred.; all; no prereq.; TWThF I-II; 202F.) Mr. Brackney.

54su. French Conversation. Equivalent to 54w (see page 89 of the Combined Cless Schedule, 1938-39). (2 cred.; jr., sr.; prereq. 3-4 or equiv.; TWThF I; 227F.) Mr. Fermaud.

* Does not count as equivalent of 6-credit course with same title in major sequence.

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

§ Does count as equivalent of 6-credit course with same title in major sequence.

106su. French Syntax and Composition. Equivalent to 103f-104w-105s (see page 89 of the Combined Class Schedule, 1938-39). Required of candidates for the Master's degree in French. (2 cred.; jr., sr., grad.; prereq. 63 or equiv.; TWThF II; 203F.) Mr. Fermaud.

116su. French Literature: 17th Century—Molière, Racine, LaFontaine. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; TWThF III; 203F.) Mr. Searles.

117su. French Literature: 17th Century—Moral and Didactic Literature. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; MTWF IV; 201F.) Mr. Searles.

119su. French Literature: 18th Century—Voltaire. Equivalent to 119w (see page 89 of the Combined Class Schedule, 1938-39.) (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; TWThF II; 201F.) Mr. Sirich.

127su. The Salon in the 18th Century. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; TWThF I; 201F.) Mr. Sirich.

132su. Baudelaire, Verlaine, and the Symbolists. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; TWThF II; 226F.) Mr. LeCompte.

166su. Parnassian Poets: Leconte de Lisle. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; TWThF III; 227F.) Mr. Clefton.

171su. History of the French Language. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or equiv.; MTWF IV; 203F.) Mr. LeCompte.

259su. Direction of Graduate Work. (Cred. ar.; grad.; hrs. ar.) Mr. Searles and others.

Spanish

1su. Beginning Spanish. (4 cred.; all; no prereq.; TWThF III, MTWF IV; 202F.) Mr. Pattison.

54su. Spanish Conversation. Equivalent to 54w (see page 91 of the Combined Class Schedule, 1938-39). (2 cred.; jr., sr.; prereq. 3-4 or equiv.; TWThF II; 227F.) Mr. Pattison.

174su. Contemporary Spanish Literature. (2 cred.; jr., sr.; prereq. 68-69 or 74-75-76 or equiv.; TWThF I; 203F.) Mr. Pattison.

SECOND TERM

French

1su. Beginning French. See 1su, first term. (4 cred.; all; no prereq.; TWThF I-II; 201F.) Mr. Clefton.

164su. Beginnings of French Romanticism. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or 73-74 or permission of instructor; TWThF III; 201F.) Mr. Clefton.

Spanish

1su. Beginning Spanish. (4 cred.; all; no prereq.; TWThF I-II; 202F.) Mr. Grismer.

2su. Beginning Spanish (continuation). (4 cred.; all; no prereq.; TWThF III, MTWF IV; 202F.) Mr. Grismer.

SOCIOLOGY AND SOCIAL WORK

FIRST TERM

Sociology

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes. and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF II, 6F., Mr. Dinkel; Sec. 2, MTWThF III, 6F., Mr. Schneider; Sec. 3, MTWThF I, 6F., Miss Williamson.)

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 9F.) Mr. Miller.

14su. Rural Sociology. A study of rural and urban relationships. The position of an agricultural class in an industrial society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF III; 2J.) Mr. Dinkel.

49su. Social Pathology. A survey course of 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, unemployment, physical diseases and defectiveness, mental deficiency, insanity, vagrancy, suicide, etc. (3 cred.; 3rd qtr. soph., jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.; MTWF IV and Th VI; 104J.) Mr. Sletto.

102su. Contemporary Penology. An analysis of some of the more important developments in recent attempts at the treatment of criminals and the prevention of crime. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy., but including Soc. 53 or consent of instructor; MTWThF I; 109J.) Mr. Vold.

103su. Sociology of Conflict. Types of social conflict and their role in social life. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF II; 109J.) Mr. Vold.

140su. History of Social Theory. A rapid survey of the leading social theories from the time of the Greeks with special reference to the more recent developments of sociology. The theories are related to their social backgrounds. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VI; 109J.) Mr. Schneider.

146su. Community Organization and the Social Setting of Recreation. (3 cred.; jr., sr., grad.; prereq. 3 courses in soc. sci. including Soc. 47 or equiv.; MTWThF III; 104J.) Mrs. May.

160su. Population Problems. The major quantitative and qualitative problems of population in our contemporary society, including: population theories and doctrines since Malthus; the growth and distribution of population; changes in population composition and their social consequences; problems of human migration; urbanization and the ecology of the city; trends in mortality and morbidity; the quality of the population, significance of differential birth rates, heredity, and environment. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF III; 109J.) Mr. Sletto.

200su. General Seminar. (Ar.) Staff.

Social Work

129-130su.† Principles of Social Case Work. A study of the purposes, problems, and processes of generic social case work, including a study of the relationships between the individual and the social worker and community as contributory to the treatment of the problems presented. (6 cred.; grad.*; open only to students with experience in social work; prereq. 109, or equiv.; MTWThF I,II; 104J.) Mrs. Fenlason.

131su. Rural Social Work. Primarily a course on community relationships with respect to social work in small communities. (3 cred.; grad.*; prereq. 129, 153 or equiv.; MTWThF I; 9F.) Miss Hayden.

133su. Social Case Work in Health Problems. A course open only to students who are properly grounded in case work. (3 cred.; grad.*; prereq. 129, which may be taken simultaneously, and 136; MTWThF II; 25F.)

153‡-154‡-155‡su. Field Training in Case Work. (2 to 5 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 129; ar.) Mrs. Fenlason, Miss Fisk, Mrs. Swartzott.

156‡-157‡-158‡su. Field Training in Group Work. (2 to 5 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 125; ar.) Miss Phillips.

200su. General Seminar. (Ar.) Staff.

221‡-222‡-223‡su. Graduate Field Training. (4 cred.; ar.) Mrs. Fenlason.

236su. Research Topics in Social Work. (Ar.) Staff.

SECOND TERM

Sociology

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF I, 109J.; Sec. 2, MTWThF III, 2J.) Mr. McVoy.

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 2J.) Mr. Kirkpatrick.

14su. Rural Sociology. A study of rural and urban relationships. The position of an agricultural class in an industrial society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF III; 104J.) Mr. Nelson.

100su. Social Psychology. Primarily for sociology students. The social attitudes; their development and modification under social pressure; the interactions of individuals and groups. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 6, or Psy. 1-2, and 9 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VI; 109J.) Mr. Kirkpatrick.

* Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

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

‡ A fee of $3.50 is charged for each course.

110su. Rural Organization. A study of social organization as it affects living conditions in small towns and rural districts. Especially designed for rural social workers and specialists in rural sociology or agricultural economics. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF II; 104J.) Mr. Nelson.

200su. General Seminar. (Ar.) Staff.

Social Work

138su. Case Work with Children. A course dealing with the problems of case work in children's agencies. (3 cred.; grad.*; prereq. 129, 153; MTWThF III; 109J.) Mrs. Shea.

139su. Psychiatric Problems in Social Case Work. A study of the intellectual and emotional factors in human adjustment and their significance in case work. (3 cred.; grad.*; prereq. 129, 153, and Psy. 144-145 or P.M.&P.H. 61, which may be taken simultaneously; MTWThF II; 109J.) Mrs. Shea.

151su. Public Welfare Administration. Will deal especially with the development and administration of public assistance and social security. (3 cred.; grad.*; prereq. 109 or equiv.; MTWThF I; 104J.) Mr. Youngdahl.

153‡-154‡-155‡su. Field Training in Case Work. (2 to 5 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 129; ar.) Mrs. Doyle, Miss Fisk.

200su. General Seminar. (Ar.) Staff.

221‡-222‡-223‡su. Graduate Field Training. (4 cred.; ar.) Mrs. Doyle, Miss Fisk.

236su. Research Topics in Social Work. (Ar.) Staff.

SPEECH

FIRST TERM

Undergraduate Courses

Speech Clinic.‡‡‡ For students who have particular speech defects such as cleft palate, stuttering, lisping, dialect. (Ar. with director.) Mrs. Chapman, Mr. Brown, Miss Hull.

1su.‡‡ Fundamentals of Speech. Speech as social adaptation and control. Emotional problems. Technique of body and voice. Oral reading. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption; MTWThF I, 301F; MTWThF VI, 308F.) Mr. Gilkinson.

2su.‡‡ Fundamentals of Speech. Continuation of Course 1, above. (MTWThF III; 308F.) Mr. Sailstad.

* Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

‡ A fee of $3.50 is charged for each course.

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

‡‡‡ The clinic will accept a limited number of nonstudent patients on the payment of a fee of $65 for a term of eight weeks.

31su.‡‡‡ Introduction to the Theater. A course designed to acquaint the student with the theater of today. Readings and projects in various modern theater crafts. (3 cred.; prereq. 1-2-3 or 5-6 or concurrent registration; MTWThF I; 19Mu.) Mr. Whiting.

55-56su.* Argumentation and Debate. Analysis, evaluation of evidence, briefing, and strategy. The state high school subject, and coaching problems will receive special consideration. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; MTWThF I; 311F.) Mr. Knower.

61su. Speech Correction. Speech hygiene as related to personality development. Introduction to the correction of speech disorders. Speech defects as symptoms of maladjustments and organic malformations. Literature of subject. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; MTWThF II; 212F.) Mr. Bryngelson.

65su.‡‡ Radio Speech. Speech arts and psychology of the radio. Announcing and broadcasting. The radio speech. Radio drama and interpretative reading, voice, diction, articulation, pronunciation. Practice, exercises, projects, and reports on problems of appeal and audience response. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; MTWThF VII; 308F, 409F.) Mr. Ziebarth.

77su.‡‡‡ Acting. Theory and technique. Lessons in imagination, concentration, relaxation, pantomime, and characterization. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6 and consent of instructor; MTWThF II; 19Mu.) Mr. Erekson.

81su.‡‡ Interpretative Reading. Esthetic theory of literature and of oral reading. Practice in reading for interpretation and mastery of technique. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; MTWThF II; 308F.) Mr. Rarig.

93su.‡‡‡ Stagecraft: Costuming. Study of costume design and its relation to the history of the theater, the actor and the director. Color and lighting problems are considered. (3 cred.; jr., sr.; prereq. 31-32-33; MTWThF III; 20Mu.) Mr. Newgord.

Undergraduate and Graduate Courses

101-102su.* Persuasion. Psychology of persuasion. Survey of experimental literature. Critical study of models. Structure and oral style. Written speeches. Reports. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6 and Psy. 1-2; MTWThF III; 311F.) Mr. Gilkinson.

105su. Theory of Reading and Acting. Literature as an art; its various forms; the psychology of the creative imagination; speech elements in literature; origins and nature of speech symbols and technique of their use. Collateral readings, problems, reports, term papers. (3 cred.; prereq. 1-2-3 or 5-6; 81-82-83, Psy. 1-2; MTWThF I; 308F.) Mr. Rarig.

111su.‡‡‡ Stage Direction. Practice and theory of stage direction; esthetics of the theater, analysis of the play, casting, rhythm, reading, organiza-

* Students may register for either quarter.
‡‡ A fee of $1 is charged for this course.
‡‡‡ A fee of $3 is charged for this course.

tion for production. (3 cred.; sr., grad.; prereq. 91-92-93; MTWThF III; 19Mu.) Mr. Lees.

115su. Playwriting and Production. Mr. Lees. (Not offered in 1939.)

121su.‡‡ Advanced Speech Problems. Introduction to research; fields and methods of study; reports of research are reviewed; emphasis on psychology of speech; projects, reports. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6, and Psy. 1-2; MTWThF II; 409F.) Mr. Knower.

131su.‡‡ Community Dramatics. The cultural values of community and children's theaters. Dramatic educational and critical literature of the field. Specimen projects, reports, term papers. (3 cred.; sr., grad.; prereq. 77-78-79, 91-92-93. 111-112-113, or permission of instructor; MTWF IV and 1 hr. ar.; 19Mu.) Mr. Lees, Mr. Mitchell.

151su.§ The Teaching of Speech. Orientation in problems of speech education. History, applications of psychology; objectives, programs, and methods; direction of extra-curricular activities; evaluation of texts. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6 or equiv., or permission of instructor; MTWThF III; 301F.) Mr. Knower.

162su.‡‡ Speech Pathology. Physiological and psychological aspects of organic and functional speech problems. Theories of stuttering. Diagnoses and treatment. Clinical observation. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6 and 61, 67; MTWF IV and 1 hr. ar.; 406F.) Mr. Bryngelson.

164-165-166su.* Clinical Methods and Practice in Speech Pathology. (6 cred.; sr., grad.; prereq. 1-2-3 or 5-6, and 61, 67, 162-163, Ed.Psy. 140, 142; consult instructor; MWF III; 406F.) Mr. Bryngelson, Mr. Brown.

171su. History of the Theater. A survey of the classic and medieval theater. Projects and reports of research in the crafts of the theater, costuming, theater construction, and acting. (3 cred.; prereq. 31-32-33; II ar.) Mr. Lees, Mr. Mitchell.

191su. Technical Problems. (Not offered in 1939.)

Graduate Courses

201su. General Seminar. (1 cred.; required of all grad. students; ar.) Staff.

207su. Seminar in Orators. A critical study of the great English and American orators. (3 cred.; prereq. 1-2-3 or 5-6, and 101-102, Psy. 1-2, 140 or 171, 10 cred. in soc. sci.; ar.) Mr. Gilkinson.

211su.§ Seminar in Dramatic Theory. An evaluation and an analysis of the critical theory of theatrical arts. A study of the major trends in drama as related to dramatic production. (3 cred.; grad.; prereq. 111-112-113, 171-172-173, and 115-116-117 or 191-192-193, 9 cred. in English, French, or German drama; ar.) Mr. Lees.

221su. Seminar in the Oral Interpretation of Literature. Problems of silent and oral reading. Theories of speech in relation to language and types

* Students should register for this course for eight weeks. They may take any two quarters. (Listed in Education as Ed.C.I. 174-175-176.)

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

‡‡‡ A fee of $3 is charged for this course.

§ Carries undergraduate credit only in the College of Education.

of literature. (2 cred.; prereq. 1-2-3 or 5-6, 81-82-83, 105, 121-122, Psy. 74.) Mr. Rarig.

261-262-263su. Seminar in Speech Pathology. A study and critical analysis of current literature in the field of speech pathology. Specific cases for group study. (6 cred. for eight weeks, 3 cred. for six weeks; prereq. 1-2-3 or 5-6, 61, 67, 121-122, 162-163, Psy. 1-2; ar.) Ar.

291-292su. Research in Specific Problems. Open to graduate students.

SECOND TERM

Undergraduate Courses

1su.‡‡ Fundamentals of Speech. Same as first term. Mr. Gilkinson.

2su.‡‡ Fundamentals of Speech. Same as first term. Mr. Gilkinson.

3su.‡‡ Fundamentals of Speech. Third quarter of Speech 1-2-3. Mr. Gilkinson.

33su.‡‡‡ Introduction to the Theater. Construction and painting of scenery. Mr. Whiting.

65su.‡‡ Radio Speech. Same as first term. Mr. Ziebarth.

78su.‡‡‡ Acting. Mr. Erekson.

92su.‡‡‡ Stagecraft: Stage Lighting. Discussion of principles and theories of lighting stage. (3 cred.; jr., sr.; prereq. 31-32-33; MTWThF III; 20Mu.) Mr. Whiting.

Undergraduate and Graduate Courses

101-102su.* Persuasion. Mr. Gilkinson.

291su. Research in Specific Problems. Open to graduate students. Mr. Gilkinson.

ZOOLOGY

(Credit is given for acceptable work done at any accredited marine or fresh-water biological station.)

FIRST TERM

1su.‡§ General Zoology. Structure, physiology, embryology, classification, and evolution of animals. (5 cred.; all; no prereq.; lect. MTWF I, Th I,II, 211Z.; lab. MTWF II,III,IV, 101Z.) Mr. Olson.

21su. Histology. Microscopic structure of the tissues and organs. (5 cred.; soph., jr., sr.; prereq. 1-2-3 or equiv.; lect. MWThF VI, T VI,VII, 211Z; lab. MWThF VII,VIII,IX, 201Z.) Mr. Ringoen.

181su. Endocrines and Reproduction. The glands of the endocrine series with special reference to those concerned with the physiology of repro-

* Students may register for either quarter.

‡ A fee of $1.50 is charged for this course.

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

‡‡‡ A fee of $3 is charged for this course.

§ The entire course in elementary zoology includes both 1su and 2su. No credit is given for 1su until the satisfactory completion of 2su.

duction. (3 cred.; jr., sr., grad.; prereq. 15 cred.; lect. MWF III,IV; 211Z.) Mr. Ringoen.

197su. Problems. Advanced work in some special line. (3 cred. or more; jr., sr., grad.; prereq. 1-2-3 and special requirements; ar.) Mr. Ringoen.

SECOND TERM

2su.*‡ General Zoology. Continuation of 1su. (5 cred.; all; prereq. 1su or equiv.; lect. MTWF I, Th I,II, 211Z; lab. MTWF II,III,IV, 101Z.) Mr. Wodsedalek.

198su. Problems. Advanced work in some special line. (3 or more cred.; jr., sr., grad.; prereq. 1-2-3 and special requirements; ar.) Mr. Wodsedalek.

Courses To Be Given at the Forestry and Biological Station, Itasca Park

54su. Parasitology. (3 cred.; prereq. zoology 15 cred.; TF.) Mr. Wallace.

55su. Natural History of Invertebrates and Fishes. (3 cred.; prereq. 1-2-3 or equiv.; WS.) Mr. Eddy.

107su. Protozoology. (3 cred.; prereq. zoology 15 cred.; MTh.) Mr. Turner.

108su. Advanced Protozoology. (3 cred.; prereq. 107, or may be taken with 107; TF.) Mr. Turner.

116su. Limnology. (3 cred.; prereq. zoology 15 cred.; MTh.) Mr. Eddy.

147su. Helminthology. (3 cred.; prereq. Zool. 51, 54, or 144; MTh.) Mr. Wallace.

198su. Problems in Parasitology or Limnology. (Cred. ar.; prereq. 1-2-3, and special requirements; adv. students.) Mr. Riley, Mr. Eddy, Mr. Wallace.

* The entire course in elementary zoology includes both 1su and 2su. No credit is given for 1su until the satisfactory completion of 2su.

‡ A fee of $1.50 is charged for this course.

INSTITUTE OF TECHNOLOGY

COLLEGE OF ENGINEERING AND ARCHITECTURE*

AERONAUTICAL ENGINEERING

FIRST TERM

1su. General Aeronautics. A general course in aeronautical engineering intended primarily for men who want to acquire general study of the principles involved in the construction and operation of aircraft. History. Nomenclature. Resistance and aerodynamical characteristics of bodies. The airplane and its parts. Constructional details. Propeller theory. Performance. Principles of structural analysis of airplanes. Uses and types of aircraft and instruments. Lectures and laboratory demonstrations. Recommended for high school teachers of physical sciences, mathematics, and manual training who are often faced with general questions pertaining to aviation. (3 cred.; prereq. trigonometry; 107A.) Mr. Ruffner.

ARCHITECTURE AND FINE ARTS

FIRST TERM

AD-Isu.†‡‡ Architectural Design, Grade I. (Page 79.) (Up to 5 cred.; no prereq.; MTWTh VI-VIII or ar.; 317E.) Mr. Cerny.

AD-IIsu.†‡‡ Architectural Design, Grade II. (Page 79.) (Up to 6 cred.; prereq. AD-I or equivalent; MTWTh VI-VIII or ar.; 317E.) Mr. Cerny.

SD-Isu. Stage Design. (Page 79.) (2 or 4 cred.; no prereq.; MTWTh I-III; 405E.) Mr. Burton.

DP-Isu.‡ Drawing and Painting, Grade I. (Page 80.) (2 or 4 cred.; no prereq.; MTWTh I-III or ar.; 417E.) Mr. Turner.

DP-IIsu.‡ Drawing and Painting, Grade II. (Page 80.) (2 or 4 cred.; prereq. DP-I or equiv.; MTWTh I-III or ar.; 417E.) Mr. Turner.

DP-IIIsu.‡ Drawing and Painting, Grade III. (Page 80.) (2 or 4 cred.; prereq. DP-II or equiv.; MTWTh I-III or ar.; 417E.) Mr. Burton.

DP-IVsu.‡ Drawing and Painting, Grade IV. (Page 80.) (2 or 4 cred.; prereq. DP-III or equiv.; MTWTh I-III; 417E.) Mr. Burton

DP-Vsu. Drawing and Painting, Grade V. (Page 80.) (2 or 4 cred.; prereq. DP-IV or equiv.; hrs. ar.; 417E.) Mr. Burton.

M-Isu.‡ Modeling, Grade I. (Page 80.) (2 or 4 cred.; no prereq.; MTWTh I-III or ar.; 405E.) Mr. Turner.

M-IIsu.‡ Modeling, Grade II. (Page 80.) (2 or 4 cred.; no prereq.; MTWTh I-III or ar.; 405E.) Mr. Burton.

* Page numbers in course descriptions refer to the Bulletin of the Institute of Technology for 1938-39, where further information may be found.

† These courses will be given if a sufficient number of students apply for them before June 15, 1939.

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

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

CIVIL ENGINEERING

FIRST TERM

17su.† Surveying. (Page 93.) Open to students other than civil engineers. (3 cred.; prereq. trigonometry; hrs. ar.; 217E.) Mr. Boon.

31,32,33su.† Stresses and Structural Design. (Page 95.) (2, 3, and 4 cred., respectively; prereq. M.&M. 26, 141, and 128 and Draw. 23, respectively; hrs. ar.; 225E.) Mr. Andersen.

38,39,41su. Structural Analysis and Design. (Page 95.) (9 cred.; arch.; prereq. M.&M. 93; hrs. and room ar.) Mr. Wise.

134§,131§-132su.† Statically Indeterminate Structures, Bridge Analysis, and Bridge Design. (Page 95.) (3 cred. for 134, 2 cred. each for 131 and 132; sr. civil engr. and aero, engr. with M.&M. 128; ar.; 225E.) Mr. Wise.

137su.† Structural Laboratory. (Page 96.) (2 cred.; prereq. 134 [or accompanied by 134], 141; hr. ar.; Ex.) Mr. Hughes.

141su.† Reinforced Concrete. (Page 96.) (3 cred.; prereq. M.&M. 128; hrs. ar.; 225E.) Mr. Hughes.

142su.† Reinforced Concrete Design. (Page 96.) (3 cred.; prereq. 141; hrs. ar.; 225E.) Mr. Hughes.

DRAWING AND DESCRIPTIVE GEOMETRY

FIRST TERM

1,2su. Engineering Drawing. (Page 98.) (3 cred. each; prereq. solid geometry; 18 hrs. ar.; 201E.) Mr. Schuck.

3su. Descriptive Geometry. (Page 99.) (3 cred.; prereq. 2, M.&M. 11; lect. MTWThF I, 205E.; lab. 12 hrs. ar., 201E.) Mr. Eggers.

4,5,6su. Engineering Drawing and Descriptive Geometry. (Page 99.) (2 cred. each; chem. and chem. engr.; prereq. solid geometry; 12 hrs. ar.; 201E.) Mr. Schuck.

7,8su. Engineering Drawing and Descriptive Geometry. (Page 99.) (3 cred. each; chem. and chem. engr.; prereq. solid geometry; 18 hrs. ar.; 201E.) Mr. Eggers.

10su. Solid Geometry. (Page 99.) (4 cred.; prereq. plane geometry; MTWThF I, plus 3 hrs. ar.; 203E.) Mr. Eggers.

11,12,13su. Engineering Drawing. (Page 99.) (2 cred. each; miners; prereq. solid geometry, 12 hrs. ar.; 101E.) Mr. Schuck.

14su. Descriptive Geometry. (Page 99.) (4 cred.; miners; prereq. 13; 24 hrs. ar.; 201E.) Mr. Eggers.

21,22,23su. Drafting. (Pages 99-100.) (2 cred. each; civil engr.; prereq. 3; 12 hrs. ar.; 101E.) Mr. Schuck.

26su. Drafting. (Page 100.) (2 cred.; electrical engr.; prereq. 3; 12 hrs. ar.; 101E.) Mr. Eggers.

28,29su. Drafting. (Page 100.) (2 cred. each.; aero. engr.; prereq. 3; 12 hrs. ar.; 101E.) Mr. Eggers.

† These courses may be given if a sufficient number of students apply for them before June 15, 1939.

§ C.E. 134 is accepted as a substitute for Aero.E. 115.

34su. Lettering. (Page 100.) (1 cred.; prereq. 1; 6 hrs. ar.; ar.) Mr. Schuck.

41-42-43su.* Technical Drawing. (Page 100.) (2 cred. each; no prereq.; Sec. 1, MWF VI-VII; Sec. 2, MWF VIII-IX; Sec. 3, ar.; 411C.) Mr. Doseff.

81-82-83su.* Advanced Drawing. (Page 101.) (3 cred. each; prereq. 43 or equiv; Sec. 1, MWF VI-VII; Sec. 2, MWF VIII-IX; Sec. 3, ar.; 411C.) Mr. Doseff.

86-87su.* Anatomical Drawing. (Page 101.) (3 cred. each; prereq. 43 or equiv.; Sec. 1, VI-VII; Sec. 2, VIII-IX; 411C.) Mr. Doseff.

SECOND TERM

1,2su. Engineering Drawing. (Page 98.) (3 cred. each; prereq. solid geometry; 18 hrs. ar.; 101E.) Mr. Quaid.

3su. Descriptive Geometry. (Page 99.) (3 cred.; prereq. 2, M.&M. 11; 18 hrs. ar.; 201E.) Mr. Levens.

4,5,6su. Engineering Drawing and Descriptive Geometry. (Page 99.) (2 cred. each; chem. and chem. engr.; prereq. solid geometry; 12 hrs. ar.; 101E.) Mr. Quaid.

7,8su. Engineering Drawing and Descriptive Geometry. (Page 99.) (3 cred. each; chem. and chem. engr.; prereq. solid geometry; 18 hrs. ar.; 101E.) Mr. Levens.

10su. Solid Geometry. (Page 99.) (4 cred.; prereq. plane geometry; MTWThF I, plus 3 hrs. ar.; 203E.) Mr. Levens.

11,12,13su. Engineering Drawing. (Page 99.) (2 cred. each; miners; prereq. solid geometry; 12 hrs. ar.; 101E.) Mr. Quaid.

14su. Descriptive Geometry. (Page 99.) (4 cred.; miners; prereq. 13; 24 hrs. ar.; 201E.) Mr. Levens.

21,22,23su. Drafting. (Pages 99-100.) (2 cred. each; civil engr.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Levens.

26su. Drafting. (Page 100.) (2 cred.; electrical engr.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Quaid.

28,29su. Drafting. (Page 100.) (2 cred. each; aero. engr.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Quaid.

34su. Lettering. (Page 100.) (1 cred.; prereq. 1; 6 hrs. ar.; 201E.) Mr. Levens.

MATHEMATICS AND MECHANICS

FIRST TERM

9su. Higher Alegbra. (Page 117.) (5 cred.; no prereq.; MTW III-IV, Th II-III, and 2 hrs. ar.; 215E.) Mr. McNown.

11su. College Algebra. (See Math. 7, page 35 of this bulletin.)

12su. Trigonometry. (Page 117.) (5 cred.; prereq. 11; MTWF III-IV, Th II-III, and 2 hrs. ar.; 215E.) Mr. McNown.

* These courses are freehand drawing courses. They are not mechanical drawing courses except as modified for industrial education students and, in part, for geology and landscape design students. The purpose of these courses is to develop the student's skill in practical drawing, design, and esthetic expression.

13su. Analytical Geometry. (Page 118.) (5 cred.; prereq. 11 and 12; MTWF III-IV, Th II-III, and 2 hrs. ar.; 106E.) Mr. Peterson.

24su. Differential Calculus. (See Math. 50, page 35 of this bulletin.)

25su. Integral Calculus. (Page 118.) (5 cred.; prereq. 24; MTWF III-IV, Th II-III, and 2 hrs. ar.; 203E.) Mr. Peebles.

26su. Technical Mechanics: Statics. (Page 119.) (5 cred.; prereq. 25; MTWF III-IV, Th II-III, and 2 hrs. ar.; 205E.) Mr. Doeringsfeld.

SECOND TERM

9su. Higher Algebra. (Page 117.) (5 cred.; no prereq.; MTW III-IV, Th II-III, and 2 hrs. ar.; 205E.) Mr. Loye.

13su. Analytical Geometry. (Page 118.) (5 cred.; prereq. 11 and 12; MTWF III-IV, Th II-III, and 2 hrs. ar.; 205E.) Mr. Loye.

26su. Technical Mechanics: Statics. (Page 119.) (5 cred.; prereq. 25; MTWF III-IV, Th II-III, and 2 hrs. ar.; 106E.) Mr. Miller.

MECHANICAL ENGINEERING*

FIRST TERM

Woodworking Course

5su.‡ Pattern Practice and General Woodwork. (Page 122.) (2 cred.; no prereq.; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

6su.‡ Pattern Practice and General Woodwork. (Page 123.) (2 cred.; prereq. Chem. 5, Dr. 2; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

7su.‡ Advanced General Woodwork. (Page 123.) (3 cred.; prereq. 6; hrs. ar.; ME.) Mr. Richards.

Special Courses for Teachers

1su.‡ Elementary Woodworking. (Page 122.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

2su.‡ Machine Woodworking. (Page 122.) (2 to 4 cred.; prereq. 1 or permission of instructor; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

3su.‡ Wood Finishing. (Page 122.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

4su.‡ Furniture Construction. (Page 122.) (2 to 4 cred.; prereq. 2 or permission of instructor; MT I-IX, WF I-IV, Th I-III, or ar.; ME.) Mr. Richards.

Forging, Heat Treating, and Welding

11su.‡ Forging and Metal Working. (Page 124.) (2 cred.; no prereq.; hrs. ar.; ME.) Mr. Hughes.

12su.‡ Forging, Heat Treating, and Welding. (Page 124.) (2 cred.; prereq. Chem. 5, Dr. 2; hrs. ar.; ME.) Mr. Hughes.

* The shops are open at the hours stated. The student will arrange his program with the instructor.

‡ A fee of $1.50 per credit is charged for this course.

13su.‡ Advanced Welding. (Page 124.) (2 to 4 cred.; prereq. 12 or permission of instructor; hrs. ar.; ME.) Mr. Hughes.

14su.‡ General Metal Work. (Page 124.) (2 to 4 cred.; no prereq.; hrs. ar.; ME.) Mr. Hughes.

Special Courses for Teachers

11asu.‡ Welding Principles and Practice. Special course in theory and practice of welding. Includes gas welding, direct current, alternating current, and spot welding. Projects in iron, steel, brass, aluminum, etc. (2 to 4 cred.; no prereq.; hrs. ar.; ME.) Mr. Hughes.

11bsu.‡ Art Metal Work. Elementary projects in wrought iron, copper, brass, and pewter. Hot and cold forming and hammering. (2 to 4 cred.; no prereq.; hrs. ar.; ME.) Mr. Hughes.

11csu.‡ Art Metal Work. Continuation of Course 11b. Including work in drawing and upsetting to produce bowls, cups, and other articles with medium deep contours. (2 to 4 cred.; prereq. 11b; hrs. ar.; ME.) Mr. Hughes.

11dsu.‡ Art Metal Work. Continuation of Course 11c. Advanced projects involving deep drawing, embossing, enameling, soldering, and brazing of assembled projects. (2 to 4 cred.; prereq. 11c; hrs. ar.; ME.) Mr. Hughes.

Machine Shop Work

15su.‡ Machine Shop Practice. (Page 124.) (2 cred.; chem. engr. and prebus.; no prereq.; hrs. ar.; ME.) Mr. Raver.

16su.‡ Machine Shop Practice. (Page 125.) (2 cred.; prereq. 12; hrs. ar.; ME.) Mr. Crowder.

17su.‡ Machine Shop Practice. (Page 125.) (3 cred.; prereq. 6, 9, 12; hrs. ar.; ME.) Mr. Crowder.

18su.‡ Advanced Machine Shop Practice. (Page 125.) (3 cred.; prereq. 17; hrs. ar.; ME.) Mr. Crowder.

Special Courses for Teachers

15asu.‡ Elementary Machine Shop Practice. Bench and vice work in chipping, filing, scraping, fitting, and polishing. Use of lathe, planer, shaper, and drill press; kinds of cutting tools and their care. (2 to 4 cred.; no prereq.; hrs. ar.; ME.) Mr. Crowder.

15bsu.‡ Advanced Machine Shop Practice. Advanced lathe work, milling machine operation, gear cutting, precision grinding, and layout work. (2 to 4 cred.; prereq. 15a or permission of instructor; hrs. ar.; ME.) Mr. Crowder.

Foundry Laboratory

8su.‡ Foundry Practice. Theory and practice in melting and casting ferrous and nonferrous metals. Practice in making cores, bench and floor molds. Problems and reports. (2 cred.; no prereq.; hrs. ar.; ME.) Mr. Holtby.

9su.‡ Foundry Practice. Theory and practice in melting, alloying, and casting ferrous and nonferrous metals. Theory of foundry control methods,

‡ A fee of $1.50 per credit is charged for this course.

risers, feeders, gates, and pattern design. Practice in making cores and molds in relation to part design. Problems and reports. (2 cred.; prereq. Chem. 5, Dr. 2; hrs. ar.; ME.) Mr. Holtby.

10su.‡ Advanced Foundry Practice. Foundry control methods, X-ray analysis of castings. Laboratory practice in sand and metal analysis, permanent mold design and operation. Steel and malleable iron castings. Problems and reports. (2 cred.; prereq. 9 or permission of instructor, Chem. 16; hrs. ar.) Mr. Holtby.

‡ A fee of $1.50 per credit is charged for this course.

INSTITUTE OF TECHNOLOGY

SCHOOL OF CHEMISTRY*

INORGANIC CHEMISTRY

FIRST TERM

1su.‡ General Inorganic Chemistry (Nonmetals). (Page 81.) (4 cred.; no prereq.; lect. MTWThF II, MW VI, 115C; lab. M VII-VIII, TThF VI-VII, 290C.) Mr. Pervier.

4su.‡ General Inorganic Chemistry (Nonmetals). (Page 82.) (4 cred.; prereq. high school chemistry; lect. MTWThF II, W VI, 325C; lab. MTThF VI-VII, 290C.) Mr. Maynard.

6su.‡ General Inorganic Chemistry (Nonmetals). (Page 82.) (5 cred.; no prereq; lect. MTWThF II, MW VI, 115C; lab. MW VII-VIII, TTh VI-VII, F VI-VIII, 290C.) Mr. Pervier.

9su.‡ General Inorganic Chemistry (Nonmetals). (Page 82.) (5 cred.; prereq. high school chemistry; lect. MTWThF II, W VI; 325C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Maynard.

11su.‡ Qualitative Chemical Analysis. (Page 83.) (4 cred.; prereq. 3 or 5; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, 290C.) Mr. Heisig.

12su.‡ Qualitative Chemical Analysis. (Page 83.) (5 cred.; prereq. 7 or 10; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Heisig.

14su.‡ General Inorganic Chemistry (Nonmetals). (Page 83.) (4 cred.; no prereq.; lect. MTWThF II, W VI, 325C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Maynard.

102su. Semi-Micro Qualitative Analysis. (Page 84.) (3 to 5 cred.; prereq. Anal. Chem. 1, 2; lect. and lab. hrs. ar.) Mr. Barber.

103su. Advanced Inorganic Chemistry. (Page 84.) (3 cred. per qtr.; prereq. Anal. Chem. 1, 2, Organ. Chem. 52; MTWThF IV; 115C.) Mr. Maynard.

109su. Synthetic Inorganic Chemistry. (Page 84.) (3 to 5 cred.; prereq. 13 or permission of instructor; lect. and lab. hrs. ar.) Mr. Heisig.

115su.‡ Commercial Products and Their Analysis. (Page 84.) (5 cred.; prereq. Anal. Chem. 1 and 2; lect. and lab. hrs. ar.) Mr. Barber.

301su. Research in Inorganic Chemistry. (Page 84.) (Cred. and hrs. ar.) Mr. Barber, Mr. Heisig, Mr. Maynard.

SECOND TERM

2su.‡ General Inorganic Chemistry. (Page 81.) (4 cred.; prereq. 1; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, 290C.) Mr. Sneed.

5su.‡ General Inorganic Chemistry. (Page 82.) (4 cred.; prereq. 4; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, 290C.) Mr. Sneed.

* Page numbers in course descriptions refer to the Bulletin of the Institute of Technology for 1938-39, where further information may be found.

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

7su.‡ General Inorganic Chemistry. (Page 82.) (5 cred.; prereq. 6; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Sneed.

10su.‡ General Inorganic Chemistry. (Page 82.) (5 cred.; prereq. 9; lect. MTWThF II, W VI; 225C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Sneed.

15su.‡ General Inorganic Chemistry. (Page 83.) (5 cred.; prereq. 14; lect. MTWThF II, W VI, 225C; lab. MTThF VI-VII, W VII-VIII, TTh VIII, 290C.) Mr. Sneed.

104su. Advanced Inorganic Chemistry. (Page 84.) (3 cred.; prereq. Anal. Chem. 1, 2, Org. Chem. 52; MTWThF IV; 115C.) Mr. Sneed.

301su. Research in Inorganic Chemistry. (Page 84.) (Cred. and hrs. ar.) Mr. Sneed.

ANALYTICAL CHEMISTRY

FIRST TERM

1su.‡ Quantitative Analysis (Gravimetric). (Page 84.) (5 cred.; prereq. qual. anal.; lect. or rec. TTh V-VI, 315C; lab. MWF V-VIII, TTh VII-VIII, 310C.) Mr. Geiger.

7su.‡ Quantitative Analysis. (Premed.) (Page 85.) (4 cred.; prereq. qual. anal.; lect. or rec. WF V-VI; 315C; lab. MTTh V-VIII, WF VII-VIII, 310C.) Mr. Geiger.

96su. Senior Thesis. (Page 85.) (5 cred.; hrs. ar.) Mr. Geiger.

123-124su.‡ Advanced Analytical Chemistry. (Page 86.) (3 cred. each; prereq. grav. and vol. anal.; lect. or rec. hrs. ar.) Mr. Geiger.

203su. Selected Topics in Analytical Chemistry. (Page 86.) (Cred. and hrs. ar.) Mr. Geiger.

301su. Research in Quantitative Analysis. (Page 86.) (Cred. and hrs. ar.) Mr. Geiger.

ORGANIC CHEMISTRY

FIRST TERM

1su.‡ Elementary Organic Chemistry. (Page 86.) (4 cred.; prereq. 11 or 12; lect. MTWThF I, 325C; rec. TTh II, 315C; lab. MWF II-IV, 390C; lab. conference TTh III, ar. C.) Mr. Lauer.

110su.‡‡ Organic Qualitative Analysis. (Page 87.) (5 cred.; prereq. 153 or equiv.; lect. MWF I, 315C; 15 hrs. of lab. work ar.) Mr. Koelsch.

141su. Reagents in Organic Chemistry. (Page 87.) (3 cred.; prereq. 153; MTWThF IV, 315C.) Mr. Koelsch.

139su. Advanced Organic Chemistry Laboratory Work. (Page 87.) (2 or 3 cred.; prereq. 153.) Mr. Lauer.

301su. Research in Organic Chemistry. (Page 88.) (Cred. and hrs. ar.) Mr. Lauer, Mr. Koelsch.

‡ A fee of $2 is charged for this course.
‡‡ A charge of $10 is made to cover special chemicals in this course.

SECOND TERM

2su.‡ Elementary Organic Chemistry. (Page 86.) (4 cred.; prereq. Org. Chem. 1; lect. MTWThF I, 325C; rec. TTh II, 215C; lab. MWF II-IV, 390C; lab. conference TTh III, ar. C.) Mr. Arnold.

139su. Advanced Organic Chemistry Laboratory Work. (Page 87.) (2 or 3 cred.; prereq. 153.) Mr. Arnold.

302su. Research in Organic Chemistry. (Page 88.) (Cred. ar.; prereq. 110; hrs. ar.) Mr. Arnold.

PHYSICAL CHEMISTRY

FIRST TERM

109su. Elementary Physical Chemistry. (8 cred. for premedical students; prereq. two yr. col. chem., one yr. col. phys.; lect. MTWThF I-II, 215C; rec. MWF IV, 215C; lab. MTWTh VI-VIII, 190C.) Mr. Glockler.

CHEMICAL ENGINEERING

FIRST TERM

(June 19 to July 21)

151su.‡‡ Chemical Manufacture (Inorganic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Montillon.

152su.‡‡ Chemical Manufacture (Organic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Grove and assistant.

301su.‡‡‡ Research in Chemical Engineering. (Page 93.) (Cred. and hrs. ar.) Mr. Montillon.

SECOND TERM

(July 24 to August 25)

151su.‡‡ Chemical Manufacture (Inorganic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Mann.

152su.‡‡ Chemical Manufacture (Organic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Bunger, Mr. Stoppel.

301su.‡‡‡ Research in Chemical Engineering. (Page 93.) (Cred. and hrs. ar.) Mr. Mann.

THIRD TERM

(August 22 to September 29)

151su.‡‡ Chemical Manufacture (Inorganic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Rogers.

152su.‡‡ Chemical Manufacture (Organic). (Page 92.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX; 90C.) Mr. Montonna and assistant.

301su.‡‡‡ Research in Chemical Engineering. (Page 93.) (Cred. and hrs. ar.) Mr. Montonna, Mr. Rogers.

‡ A fee of $2 is charged for this course.
‡‡ A fee of $3 per term is charged for this course.
‡‡‡ A fee of $5 per term is charged for this course.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

GENERAL INFORMATION

The work offered in agriculture and home economics seeks to meet the needs of graduates of other colleges and normal schools, teachers of secondary schools, principals of schools (especially of consolidated schools), superintendents of schools, and others who desire courses in agriculture or home economics, and who wish to obtain therefor college credit, as well as to meet the needs of students seeking to complete the undergraduate college work.

GRADUATE STUDY

Opportunity is offered in several divisions for graduate study either for the first six-week term of the Summer Session or for the entire session of eleven weeks. In some divisions both courses and thesis work may be carried for the entire session. In a number of other divisions thesis work only may be pursued through the Summer Session. Students intending to register for any phase of graduate work and who expect to obtain credit in the Graduate School should make arrangements through the proper committees and with the dean of the Graduate School. Information concerning graduate work during the summer, in any division, may be obtained from the head of the division. Thesis and problem work is correlated in most divisions with the work in the Experiment Station and the facilities offered during the summer are in most divisions especially attractive on account of the field work possible only at that time. See also opportunities for summer study in the Forestry and Biological Station.

A four-week summer term is provided for teachers of agriculture who are employed on the twelve-month basis as teachers. Courses carrying graduate credit are available. A maximum of six credits per term is permitted. The term of four weeks begins Monday, June 19, and closes Friday, July 14.

ADMISSION

The undergraduate courses of the Summer Session are open to all registered students qualified to pursue the work to advantage, but college credit will be given only when college entrance requirements have been fulfilled.

For details of admission requirements, see the Bulletin of General Information.

AGRICULTURAL BIOCHEMISTRY

FIRST TERM

4su. Introduction to Organic and Biochemistry. (Page 55.*) (5 cred.; soph., jr., sr.; prereq. 1 yr. chem.; MTWThF I, II; 113SnH.) Mr. Reitz.

111su. Biochemistry. (Page 28.†) (3 cred.; jr., sr., grad.; prereq. zool. or bot., and 9 cred. in org. chem.; lect. MWF I, II; 113SnH.) Mr. Briggs.

* Page numbers in course descriptions refer to the College of Agriculture, Forestry, and Home Economics Bulletin for 1938-40, where further information may be found.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

113su. Biochemical Laboratory Methods. (Page 28.†) (2 cred.; jr., sr., grad.; prereq. quant. anal., parallel 111; lect. MWF III, IV, lab. TTh I and 1 hr. ar.; 202SnH.) Mr. Briggs and assistant.

203asu. Research Problems. (Page 29.†) (1½ or 2½ cred.; grad.; prereq. permission of instructor; ar.) Mr. Gortner, Mr. Geddes, Mr. Briggs, Miss Kennedy.

SECOND TERM

112su. Biochemistry. (Page 28.†). A continuation of Course 111su. (3 cred.; jr., sr., grad.; prereq. 111; lect. MWF I, II; 113SnH.) Mr. Sandstrom.

114su. Biochemical Laboratory Methods. (Page 28.†) A continuation of Course 113su. (2 cred.; jr., sr., grad.; prereq. 113; lect. MWF III, IV, lab. TTh I and 1 hr. ar.; 202SnH.) Mr. Sandstrom and assistant.

203bsu. Research Problems. (Page 29.†) Second part of Course 203asu. (1½ or 2½ cred.; grad.; prereq. 203a; ar.) Mr. Gortner, Mr. Palmer. Mr. Geddes.

AGRICULTURAL ECONOMICS

FIRST TERM

170su. Land Economics. (Page 58.*) (3 cred.; jr., sr., grad.; prereq. 111; ar., 312HH). Mr. Dowell.

221su. Farm Organization Studies. (Page 71.†) (3 cred.; grad.; ar., 312HH.) Mr. Pond.

SECOND TERM

200su. General Seminar in Agricultural Economics. (Page 71.†). (3 cred.; grad.; ar., 312HH.) Mr. Waite.

244su. Seminar in Co-operative Marketing. (Page 71.†) (3 cred.; grad.; ar., 312HH.) Mr. Jesness, Mr. Koller.

AGRICULTURAL EDUCATION

For list of courses in Agricultural Education see courses listed elsewhere in this bulletin under the College of Education.

AGRICULTURAL ENGINEERING

FIRST TERM

6su. Special Problems in Woodworking. Lectures, demonstrations, and shop practice in machine and hand woodworking processes, tool sharpening, saw filing, painting, glazing, and special shop problems of industrial arts and agricultural education teachers. (2 cred.; no prereq.; TWThF VII, VIII; 48En.) Mr. Christopherson.

13su. Gas Engines. Theory, operation, adjustments, and repair of gasoline engines. Lecture and laboratory practice. (2 cred.; no prereq.; TWThF VII, VIII; 216En.) Mr. Torrance.

* Page numbers in course descriptions refer to the College of Agriculture, Forestry, and Home Economics Bulletin for 1938-40, where further information may be found.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

40su. Mechanical Training. Instruction and laboratory practice in the mechanical trades, including belts, pulleys and lacings, cement work (including construction of lily pools, seats, bird baths, and flagstone walks), leather sewing and riveting, electric wiring, rope splicing, knots, and hitches. (2 cred.; no prereq.; TWThF VI, VII; 106En.) Mr. Dent.

41su. Metal Work. A course in metal work, including soldering and sheet metal work, hammered pewter and copper work, cold metal work (including lamps, flower brackets, etc.), pipe fitting and valves, forge work (including tempering and heat treatment), babbitting and bearings, oxy-acetylene welding, brazing and cutting, electric arc welding. (2 cred.; no prereq.; TWThF VI, VII; 106En.) Mr. Dent.

AGRONOMY AND PLANT GENETICS

FIRST AND SECOND TERMS

AGRONOMY

201su. Research in Farm Crops. (Page 31.†) (3 to 9 cred.; grad.; ar.) Mr. Wilson, Mr. Arny.

PANT GENETICS

241su. Research in Plant Genetics. (Page 32.†) (Grad.; ar.) Mr. Hayes, Mr. Immer, Mr. Burnham.

244su. Laboratory Methods in Plant Breeding. (Page 32.†) (3 cred.; grad.; ar.) Mr. Immer.

ANIMAL AND POULTRY HUSBANDRY

FIRST TERM

118su. Animal Breeding. A review of the more recent experiments and viewpoints pertaining to animal breeding. (2 cred. for 4 weeks; sr., grad.; no prereq. for college graduates, for undergraduates prereq. 112; MTWThF II; 3St.) Mr. Winters.

FIRST AND SECOND TERMS

213su. Research in Animal Husbandry. (Page 36.†) (3 to 9 cred.) Mr. Peters, Mr. Ferrin, Mr. Winters, Mr. Harvey, Mr. Johnson.

214su. Research in Poultry Husbandry. (Page 36.†) (3 to 9 cred.) Mr. Sloan.

DAIRY HUSBANDRY

FIRST TERM

118su. Problems in Dairy Husbandry. A study of special problems in dairy husbandry. Open only to teachers of agriculture and extension workers. First four weeks will be devoted to a study of recent developments in the feeding and management of dairy animals. An additional period of

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

two weeks will be devoted to the theory and practice of judging dairy products. (2 cred. for 4 weeks, 3 cred. for 6 weeks; no prereq. for college graduates; MTWThF I; 210HH.) Mr. Fitch, Mr. Coulter.

208su. Research in Dairy Husbandry. (Page 64.†). (Prereq. preliminary graduate work.) Mr. Fitch, Mr. Petersen, Mr. Gullickson.

209su. Research in Dairy Manufacturing. (Page 64.†). (Prereq. preliminary graduate work.) Mr. Combs, Mr. Coulter.

215su. Research in Dairy Bacteriology. (Page 64.†) (Prereq. preliminary graduate work.) Mr. Macy.

SECOND TERM

210su. Research in Dairy Husbandry. (Page 64.†) (Prereq. preliminary graduate work.) Mr. Fitch, Mr. Petersen, Mr. Gullickson.

211su. Research in Dairy Manufacturing. (Page 64.†) (Prereq. preliminary graduate work.) Mr. Combs, Mr. Coulter.

216su. Research in Dairy Bacteriology. (Page 64.†) (Prereq. preliminary graduate work.) Mr. Macy.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

FIRST TERM

13su. Field Zoology. Offered at Itasca Park. (1 cred.; fr.; no prereq.) Mr. Mickel, Mr. Hodson.

FIRST AND SECOND TERMS

197su. Introduction to Research. Preparation for investigational work in lines of entomology. Advanced laboratory, field, and library work; training in the preparation of bibliographies and manuscripts; special problems. (2½ or more cred.; jr., sr., grad.; prereq. 9 hrs. ent., and other prescribed work; ar.; Ad.) Mr. Riley, Mr. Ruggles, Mr. Tanquary, Mr. Granovsky, Mr. Mickel, Mr. Hodson, Mr. Shepard, Mr. Swanson.

204su. Research in Entomology. Ample opportunity for research work in various phases of entomology will be afforded properly qualified students. This work will be individual. Students who plan to undertake special problems should correspond with the division relative to methods of collection and preparation of material. (3 or more cred.; grad.; ar.) Mr. Riley, Mr. Ruggles, Mr. Tanquary, Mr. Granovsky, Mr. Mickel, Mr. Shepard.

SECOND TERM

Courses To Be Given at the Forestry and Biological Station, Itasca Park

59su. Field Entomology. (3 cred.; jr., sr.; prereq. Zool. 1-2-3, or equiv.; TF.) Mr. Granovsky.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

62su. Wildlife Conservation Principles and Administration. (3 cred.; prereq. Zool. 1-2-3, or equiv.; WS.) Mr. Swanson.

68su. Natural History of the Higher Vertebrates. (3 cred.; prereq. Zool. 1-2-3, or equiv.; MTh.) Mr. Swanson.

76su. Techniques of Field Biology. (2 cred.; prereq. bot. or zool. 10 cred. or consent of instructor; TTh.) Mr. Granovsky and staff of the station.

196su. Special Problems in Entomology and Economic Zoology. (Cred. ar.; adv. students with proper qualifications.) Mr. Granovsky, Mr. Swanson.

For detailed description of courses offered see Forestry and Biological Station.

FORESTRY

FIRST TERM

(Offered at Itasca Park. Open only to students who have completed at least one year of forestry in the University or one year in a junior college or other college. The schedule is so arranged as to occupy the students' full time for five days per week. All field or laboratory work. Registration is limited to a maximum of 120).

2su. Field Dendrology. (Page 74.*) (1 cred.; no prereq.) Mr. Gordon.

5su. Field Silviculture. (Page 74.*) (2 cred.; no prereq.) Mr. Cheyney.

6su. Field Mensuration. (Page 75.*) (1 cred.; no prereq.) Mr. Brown.

9su. Camp Management. (Page 75.*) (1 cred.; no prereq.) Mr. Brown.

Bot. 3su. Forest Botany. (See under College of Science, Literature, and the Arts—Botany.)

Ent. 13su. Field Zoology. (See under Entomology and Economic Zoology.)

SECOND TERM

Courses To Be Given at the Forestry and Biological Station, Itasca Park

11su. Field Dendrology. (3 cred.; prereq. Bot. 10 cred., or consent of instructor; TF.) Mr. Buell.

For detailed description of courses offered see Forestry and Biological Station.

HOME ECONOMICS

FIRST TERM

Undergraduate Courses

21su. Color and Design I. (Page 79.*) (3 cred.; prereq. 20 or equiv.; MTWThF VII, VIII; 110HE.) Miss Cox.

30su. Introduction to Nutrition. (Page 80.*) (2 cred.; no prereq.; MTWF VI; 313HE.) Miss Biester.

61su. Quantity Cookery. (Page 81.*) (4 cred.; jr., sr.; prereq. 40, 41 or equiv.; MTWF II, III, IV, Th II; Cafeteria.) Miss Dunning.

86su. Home Management: Operation and Maintenance, Laboratory. (Page

* Page numbers in course descriptions refer to the College of Agriculture, Forestry, and Home Economics Bulletin for 1938-40, where further information may be found.

82.*) (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40; hrs. ar.; limited to 14.) Miss Studley.

Graduate Courses

115su. Clothing Economics. (Page 82.*) (2 cred.; jr., sr.; prereq. 50, Agr. Econ. 3; TWThF V; 305HE.) Miss Phelps.

125su. Advanced Costume Design. (Page 82.*) (3 cred.; jr., sr.; prereq. 4, 55, 26 recommended. or permission of instructor; MTWThF I, II; 114HE.) Miss Cox.

137su. Consumer Problems. A study of the problems confronting the homemaker as a consumer of the things needed for the comfort and satisfaction of the family. Materials and methods of consumer education. (3 cred.; prereq. Agr. Econ. 3 or permission of instructor; MTWThF V, Th IV; 203HE.) Miss Coles.

142su. Experimental Cookery. (Page 83.*) (3 cred.; jr., sr.; prereq. 40, Agr. Biochem. 4; MTWThF I, II and 2 hrs. ar.; 107HE.) Miss Donelson.

170su. Current Nutritional Problems. Discussion and reading covering recent findings in the field of human nutrition. Emphasis will be placed on the needs of home economics teachers, extension teachers, and teachers of adult classes for new information in this field. (3 cred.; jr., sr.; prereq. 30 or 31, 40, Agr. Biochem. 4; Physiol; MTWThF IV; 313HE.) Miss Biester.

184su. Home Management Problems. A consideration of the problems of the management of the home, including a study of foods, clothing, shelter, and money management. (3 cred.; jr., sr., grad; prereq. 41 or equiv., H.E.Ed. 90 or equiv.; MTWThF III; 203HE.) Miss Studley.

185su. Family Relationships. (Page 83.*) (2 cred.; jr., sr., grad.; prereq. 86 or parallel, H.E.Ed. 90 or C.W. 40, or permission of instructor; MTWF IV; 213HE.)

186su. Problems in Income Management. (Page 84.*) (3 cred.; prereq. 85 or parallel, 86, 170 or equiv., Agr. Econ. 3; MTWThF VI; 203HE.) Miss Coles.

209su. Seminar in Textiles and Clothing. (Page 114.†) (1 cred.; 2 hrs. ar.; registration with permission of instructor; 307HE.) Miss Phelps.

249su. Seminar in Foods. (Page 114.†) (2 cred.; MTWTh VI; registration with permission of instructor; 213HE.) Miss Donelson.

279su. Seminar in Nutrition. (Page 114.†) (1 cred.; 2 hrs. ar.; registration with permission of instructor; 313HE.) Miss Biester.

295su. Home Economics Problems. (Page 114.†) (3 cred.; MTWThF II and 1 hr. ar.; registration with permission of instructor; 305HE.) Miss Phelps.

HOME ECONOMICS EDUCATION

For list of courses in Home Economics Education see courses listed elsewhere in this bulletin under the College of Education.

* Page numbers in course descriptions refer to the College of Agriculture, Forestry, and Home Economics Bulletin for 1938-40, where further information may be found.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

HORTICULTURE

FIRST TERM

135su. Potatoes. Color, handling, storage, seed maintenance, varieties, improvement, and physiology of the potato plant. (2 cred.; jr., sr., grad.; prereq. 10 cred. in bot. or equiv.; MTW VII, VIII; 103Hr.) (Four weeks). Mr. Krantz, Mr. Hutchins.

FIRST AND SECOND TERMS

190-191-192su. Special Problems. (Page 117.†) (2 to 4 cred.; jr., sr., grad.; ar.; Hr.) Mr. Alderman, Mr. Brierley, Mr. Harvey, Mr. Krantz, Mr. Currence, Mr. Wilcox, Mr. Hutchins.

247su. Report on Special Horticultural Topics. (Page 117.†). (9 cred.) Mr. Alderman, Mr. Brierley, Mr. Harvey, Mr. Krantz, Mr. Currence, Mr. Longley, Mr. Wilcox.

PLANT PATHOLOGY AND BOTANY

FIRST AND SECOND TERMS

206su. Research in Plant Pathology. (Page 149† description for Course 203-204-205.) (Cred. ar.; grad.; PP.) Mr. Stakman, Mr. J. J. Christensen, Mr. Eide, Miss Dosdall.

210su. Research in Mycology. (Page 149.†) (3 cred.; grad.; prereq. 105-106-107; PP.) Mr. Stakman, Miss Dosdall.

257su. Research Problems in Applied Plant Physiology. (Page 150.†) (Cred. ar.; grad.; PP.) Mr. Harvey, Mr. Landon.

SECOND TERM

Courses To Be Given at the Forestry and Biological Station, Itasca Park

50su. Field Mycology. (3 cred.; prereq. one yr. of bot. or equiv. or consent of instructor; TF.) Mr. C. M. Christensen.

210su. Research in Mycology. (3 cred.; grad.; prereq. 105-106-107.) Mr. C. M. Christensen.

For detailed description of courses offered, see Forestry and Biological Station.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

FORESTRY AND BIOLOGICAL STATION

During the second term of the Summer Session an excellent opportunity for the study of terrestrial and fresh-water biology in its most fundamental aspects is presented by the Forestry and Biological Station of the University of Minnesota, located at Itasca Park.

Conducted co-operatively by various departments in the College of Agriculture, Forestry, and Home Economics and the College of Science, Literature, and the Arts, classes at the station will be held beginning July 31, ending September 2.

GENERAL INFORMATION

Courses are designed to provide opportunity for instruction and research and to train scientific investigators in the field of terrestrial and fresh-water biology. An excellent opportunity for study of the rich flora and fauna found in the midwestern and Lake States regions is afforded at the station.

Field trips and indoor laboratory work are given on designated days. In the field the student visits typical habitats and gathers specimens for laboratory study, supplemented by informal lectures by instructors in charge of each tour. The same scholastic standards are maintained at the station as on the campus of the University of Minnesota and college credit is given for work satisfactorily accomplished.

The interested students may find the following opportunities offered by the Forestry and Biological Station at Itasca Park:

1. Elementary and advanced instruction during the five weeks of the second term of the University Summer Session (July 31 to September 2) for college undergraduates, graduate students, high school and nature study teachers, and others interested.
2. Opportunities to graduate students who may wish to pursue biological investigation in the lakes, fields, or forests close to the station.
3. Opportunities to teachers of botany, zoology, and biology as well as to guest investigators for independent research in terrestrial and fresh-water biology.

FEES AND EXPENSES

Registrations will be accepted during the week of July 24 to July 31. The following fees are payable by each registrant on or before July 31 and must be paid before registration is completed:

Tuition fee	$21.80
Health fee	1.00
Total tuition fee	$22.80
General deposit fee	2.00
Equipment fee	10.00
Total fees for the term	$34.80

In addition it is estimated on the basis of the experience of other groups of students that the cost of board will not exceed a total of $30 for the five weeks.

Charges for lockers, laboratory breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

Equipment fees include the use of microscopes, nets, boats, various class supplies, and accessories.

The estimated cost of $67 for the five-week session does not include traveling expenses, clothing, laundry, and minor incidental personal expenses.

Tuition and fees are payable on or before July 31. After July 31 the late registration fee will be charged according to the following schedule:

Tuesday,	August 1	$2.00
Wednesday,	August 2	3.00
Thursday,	August 3	4.00
Friday,	August 4	5.00

No registration will be accepted after August 4 without the approval of the professor in charge and payment of a $5 fee.

ADMISSION

The courses in the Forestry and Biological Station are open to all qualified graduate and undergraduate students who have had usual preliminary courses in biological subjects, as well as to qualified high school graduates. Certain courses are especially designed for the teachers of biological subjects in colleges, high schools, and public schools, and others interested in plant and animal life. Graduate registrations must be approved by the major department and these submitted to the Graduate School for final approval.

Registration may be completed at any time during the months of June and July, but not later than July 31 at the registrar's office of either campus of the University of Minnesota. Application for admission to the station should be made on a form which may be obtained from the registrar's office upon request.

For the 1939 session not more than one hundred (100) applicants can be admitted, and the priority of registration will govern admission.

For further information write to the registrar of the University of Minnesota, Minneapolis, for special folder describing the Forestry and Biological Station.

SECOND TERM OF SUMMER SESSION

The courses to be given at the Forestry and Biological Station will begin July 31 and close September 2. Special arrangement will be possible for those whose school or other duties make it impossible to remain through the final week of the session.

The following courses are offered in the Forestry and Biological Station for the year 1939 at Itasca Park during the second term of the Summer Session:

BOTANY

8su. Elements of Field Taxonomy. The identification of common wild flowers, and a general study of the classification and relationship of flowering plants. Field work in forest, swamp, bog, lake, and prairie. (3 cred.; prereq. Bot. 1, or consent of instructor; WS.) Mr. Buell.

11su. Field Botany. A general elementary field course in plant life. Fundamental facts of structure, growth, reproduction, relation of plants to each other and to their environment. Excursions with lectures and demonstrations to meet the needs of teachers of elementary botany and nature study, scout and camp leaders, and all who would know more about Minnesota plant life. (3 cred.; no prereq.; MTh.) Mr. Buell.

20su. Elementary Field Ecology. An outline of the fundamental concepts of ecology illustrated directly by examples in the field. A study of the mature plant communities and the various lines of succession leading to them. (3 cred.; no prereq.; MTh.) Mr. Lawrence.

62su.‡ Bryophytes and Pteridophytes. A study of the structure, life histories, and classification of liverworts, mosses, and ferns. Textbook: Coulter, Barnes and Cowles, *Textbook of Botany,* Vol. 1. (3 cred.; jr., sr.; prereq. Bot. 10 cred., or consent of instructor; TF.) Mr. Rosendahl.

115su. Advanced Taxonomy of Flowering Plants. Advanced work in classification and relationships of flowering plants. Field trips, laboratory, and lectures. Text required: *Gray's New Manual of Botany* or any other manual approved by instructor. (3 cred.; prereq. Bot. 10 cred. incl. Bot. 7; WS.) Mr. Rosendahl.

135su.‡ Field Research Methods in Ecology. An advanced course in field ecology dealing chiefly with methods of studying community characteristics, rate of vegetational change, and the technique of measuring environmental influences. (3 cred.; prereq. Bot. 18 cred. incl. Bot. 21 or equiv.; WS.) Mr. Lawrence.

196su. Special Problems in Ecology or Taxonomy. Advanced studies in ecology or taxonomy with opportunity for individual field work and research. (Cred. ar.; adv. students with proper qualifications.) Mr. Rosendahl, Mr. Lawrence.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

59su. Field Entomology. A study of the insect fauna in various natural habitats of the park and surrounding areas. The course includes field trips, collection and classification of insects, as well as studies of general morphology, life histories, and habits of local species under ecological conditions governing the distribution of insect fauna of the region.. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.; TF.) Mr. Granovsky.

62su. Wildlife Conservation Principles and Administration. A general course dealing with the various values of wildlife, the nature of the biological mechanism involved in its conservation, and the economic, administrative, and legislative consideration of a conservation program. Treats of the values of wildlife, attitudes toward this resource, the essentials of wildlife environments, the requirements of the various species, and species and population properties. Lectures, laboratory, and field work. (3 cred.; prereq. Zool. 1-2-3 or equiv.; TF.) Charges for car mileage for field trips in this course will average $4 to $5 per student. Mr. Swanson.

68su. Natural History of the Higher Vertebrates. Life histories, habits, economic importance, and identification of amphibians, reptiles, birds, and

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

mammals, with special reference to the local species. References: Pratt, *Manual of Vertebrate Animals of the United States;* Wright, *Handbook of Frogs and Toads;* Peterson, *Field Guide to the Birds.* (3 cred.; prereq. Zool. 1-2-3 or equiv.; MTh.) Charges for car mileage for field trips in this course will average $4 to $5, or one cent per mile per student. Mr. Swanson.

76su. Techniques of Field Biology. A study of available flora and fauna including the methods of collection, preservation, arrangement, and demonstration of illustrative material and effective presentation to classes. Lectures, laboratory, and field work by the entire staff of the station, each instructor presenting the selected methods in his respective field. This course is primarily designed to meet the needs of teachers of biological subjects. (2 cred.; prereq. bot. or zool. 10 credits or consent of instructor; WS.) Mr. Granovsky and staff of the station.

196su. Special Problems in Entomology or Economic Zoology. Advanced work in entomology and economic zoology with ample opportunity for individual research, especially in various phases of faunistic studies in terrestrial, aquatic, and forest entomology and economic zoology. (Cred. ar.; adv. students with proper qualifications.) Mr. Granovsky, Mr. Swanson.

FORESTRY

11su. Field Dendrology. Trees and shrubs found in the Itasca Park region, with special reference to identification by means of constant characters. (Not open for credit to students in Forestry.) Text required: Rosendahl and Butters, *Trees and Shrubs of Minnesota.* (3 cred.; prereq. bot. 10 cred., or consent of instructor; WS.) Mr. Buell.

PLANT PATHOLOGY AND BOTANY

50su. Field Mycology. Taxonomy and classification of fungi, particularly mushrooms, wood rotting fungi, and those which cause disease of forest trees. Field collections, laboratory work, and lectures. (3 cred.; prereq. one yr. of bot. or equiv., or consent of instructor; TF.) Mr. C. M. Christensen.

210su. Research in Mycology. Research work along following suggested lines: taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigation of fungi involved in special industrial or natural processes; morphology or physiology of special forms. (3 cred.; grad.; prereq. 105-106-107.) Mr. C. M. Christensen.

ZOOLOGY

54su. Parasitology. A study of animal parasites and parasitism in lecture, laboratory, and field work, with special emphasis on local forms. Text required: Riley, *Introduction to the Study of Animal Parasites and Parasitism.* References: Hegner, Root, and Augustine, *Animal Parasitology with Special Reference to Man and Domesticated Animals,* and Brumpt, *Précis de Parasitologie.* (3 cred.; prereq. zool. 15 cred.; TF.) Mr. Wallace.

55su. Natural History of Invertebrates and Fishes. A survey of the local fauna, including life histories and habitats. Text required: Needham and Needham, *Guide to the Study of Fresh Water Biology*. (3 cred.; prereq. Zool. 1-2-3 or equiv.; WS.) Mr. Eddy.

107su. Protozoology. A survey of the Protozoa, with special reference to their structure and life histories. Text (not required): Kudo, *Handbook of Protozoology*. (3 cred.; prereq. zool. 15 cred.; MTh.) Mr. Turner.

108su. Advanced Protozoology. Continuation of 107, with emphasis on methods of collection, cultivation and preparation of free-living and some parasitic forms. Introduction of cytology of Protozoa also included. (3 cred.; prereq. 107, or may be taken with 107; TF.) Mr. Turner.

116su. Limnology. A study of the conditions of life and the distribution of organism in the lakes of the Itasca region. Text required: Welch, *Limnology*. References: Ward and Whipple, *Fresh-Water Biology*, or Needham and Needham, *Guide to the Study of Fresh Water Biology*. (3 cred.; prereq. zool. 15 cred.; MTh.) Mr. Eddy.

147su. Helminthology. A survey of the worm parasites of local animals with special emphasis on classification and the study of life cycles by the experimental method. (3 cred.; prereq. Zool. 51, 54, or 144; MTh.) Mr. Wallace.

198su. Problems in Parasitology or Limnology. Principles and further work in special lines adapted to needs of individual students. (Cred. ar.; prereq. Zool. 1-2-3, and special requirements; adv. students.) Mr. Riley, Mr. Eddy, Mr. Wallace.

The above described courses are listed under the respective departments of the College of Science, Literature, and the Arts and the College of Agriculture, Forestry, and Home Economics in this bulletin.

MEDICAL SCHOOL

GENERAL INFORMATION

GENERAL

Any of the courses offered by the departments of the Medical School (except section clinics of limited registration) are open to any student in the Summer Session, who has the necessary preparation to benefit therefrom.

FEES—MEDICAL STUDENTS

The Medical School tuition fee for a full Summer Session is $75 for residents of Minnesota, and $125 for nonresidents. Less than a full program may be paid for on a clock-hour basis, namely $3.25 (nonresidents. $5.75) for each weekly clock hour of scheduled work per quarter. In addition each student will pay the incidental fee of $6, and a deposit of $15 for men, $5 for women. Students in certain courses are required to furnish microscopes.

Term fees are one half the quarter fees. Laboratory fees are not required under this plan. The schedule of total fees will therefore be:

	Per Quarter	Per Term
Tuition fee	$75.00 ($125.00)	$37.50 ($62.50)
Incidental fee	6.00	3.00
Deposit (men)	15.00	15.00
Deposit (women)	5.00	5.00

Fees must be paid on the above basis by all who elect the program of clinical subjects in the senior medical year; and by all who desire time credit on the medical course in this or any other medical school.

FEES—SUMMER SESSION STUDENTS

Students who do not desire to register for time credit toward a medical degree nor for a program of clinical subjects may pay on the above basis; or at their option they may pay the regular Summer Session fee of $25 per term, plus special course fees as indicated in course descriptions and a $2 deposit.

CLINICAL YEARS

The Medical School offers a full regular program for any quarter of the senior year. In order to receive legal time credit toward the degree of doctor of medicine or bachelor of medicine in this institution, students must be matriculated in the Medical School; see the Bulletin of the Medical School for requirements for admission and regulations governing advanced standing. Medical students from other schools who desire to enter for the summer only may do so as unclassed students, receiving subject credit only. If such students desire legal time credit toward a medical degree, they should make arrangements with the institution from which they intend to take the degree. No obligation to accept such students into regular classes at this school is attached to unclassed registration. Such students from other medical schools may take one of the programs listed below (except section clinics if already

full) or, provided there is room in the classes, make up a special program from the courses offered. Admission to any course is conditioned upon the limit set by the department concerned.

Students from other institutions should consult the Bulletin of the Medical School to make sure to what extent the courses listed fulfill their respective needs. They should consult the dean or department heads in their own schools as to equivalence of the courses offered at the University of Minnesota.

PROGRAMS FOR CLINICAL YEARS

The following are the required courses to be offered in the clinical years.

Junior Year in the Medical School

No didactic courses for juniors are offered in the Summer Session nor is any division of the junior class in regular attendance. However, junior students of this or other schools who desire to extend their clinical knowledge may register for the courses offered below if there is room in the classes. No Minnesota junior may register for clerkship work for senior credit until he has passed the Junior Comprehensive Examination.

Senior Year in the Medical School

The program for the Summer Session will consist of the following courses. For description and schedules see departmental statements.

Division A, Medicine Clerkship Quarter

Med. 30su, 35su, 44su, 47su; Obs. 30su; Path. 109su; Ped. 30su; Surg. 30su.

Division B, Obstetrics and Pediatrics Clerkship Quarter

Med. 30su; Obs. 30su, 35su; Path. 109su; Ped. 30su, 35su; Surg. 30su.

Division D, Surgery Clerkship Quarter

Med. 30su; Obs. 30su, 35ysu; Path. 109su; Ped. 30su; Surg. 30su, 35su, 49su; O. and O. 36su, 37su, 38su.

Under the curriculum, senior students are assigned to a particular clerkship and to particular dispensary clinics each quarter, for which see special schedules.

LABORATORY YEARS

No regular programs for freshman or sophomore medical students are offered, but many of the courses of these years will be given (see departmental statements for description of courses, program of hours, and laboratory fees). These courses may be taken by properly prepared students from other institutions as unclassed students, without matriculation in the Medical School. But students who desire to secure time credit toward the degree of doctor or bachelor of medicine in this school must matriculate and secure written consent from the officers of the school from which they expect to receive their medical degrees.

OPPORTUNITY FOR PRACTITIONERS

All the Summer Session courses offered are open to physicians, who will be registered as special students. Attention is also called to short courses offered from time to time throughout the year under the General Extension Division and the Center for Continuation Study. These courses are exclusively for practitioners and are largely practical in nature. Circulars will be sent on request.

The regular clinics in the University of Minnesota Hospitals and Dispensary, the Minneapolis General Hospital, the Ancker Hospital, Glen Lake Sanatorium, and the Wilder Dispensary, St. Paul, will go on as usual during the Summer Session, and will be open to visiting physicians.

ELECTIVES

Various electives will be offered in the laboratory and clinical departments. See departmental statements in this bulletin and also special Summer Session programs of the Medical School for details.

GRADUATE COURSES

Attention is called to opportunities offered in Medical School departments to work during the Summer Session for advanced degrees, either in laboratory or clinical branches.

GRADING

Regular medical students are subject to the comprehensive examination rules. These examinations cover all courses of respective years of the curriculum. The comprehensive examinations are offered at the end of the spring quarter and in the week before the opening of the University in the fall. Students desiring to enter from another medical school with advanced standing are required to take the comprehensive examination for (at least) the year preceding the one they desire to enter. For admission to the junior year, Part I of the National Board Examinations is accepted in lieu of the comprehensive examinations of the school, provided the grades received therein are satisfactory to the Admissions Committee. Summer Session students, not candidates for the medical degree in this school, are subject to ordinary course examinations and are graded in the regular way.

STUDENTS IN NURSING

No beginning student can be received in the Summer Session. For the regular courses, requirements, etc., see the Bulletin of the School of Nursing.

FEES FOR STUDENTS IN THE SCHOOL OF NURSING

Students in the School of Nursing who give hospital service during the Summer Session may carry any of the following courses: Pharmacology 7, 8; Nursing 2, 6, 11, 15, 23, 35, 36, 52, 60, 72, 73, 74; Preventive Medicine and Public Health 40, 53, 58, 60, 61, 62, 64; Child Welfare 40, 80 for which the hospital service is accepted in lieu of tuition.

Undergraduate students in the School of Nursing who are not on duty

in the hospital during the summer will be charged $1 per clock hour for the above courses plus a $6 incidental fee.

All students in the School of Nursing who take courses other than those listed above and any student registering in the School of Nursing for the Summer Session only will pay regular Summer Session fees for each term.

POSTGRADUATE STUDENTS

The School of Nursing admits postgraduate students at the beginning of each quarter for one-year courses. Such applicants must meet the university entrance requirements and be graduates of accredited schools of nursing. For further information see the Bulletin of the School of Nursing.

TEACHERS AND ADMINISTRATORS OF NURSING SCHOOLS

Special courses for teachers and administrative officers in nursing schools will be offered in the Summer Session. See departmental announcements of Nursing Instruction and of Preventive Medicine and Public Health. For a circular giving full particulars concerning these courses apply to the director of the School of Nursing.

PUBLIC HEALTH NURSING

See Department of Preventive Medicine and Public Health in this bulletin for special courses in Public Health Nursing.

COURSES FOR MEDICAL TECHNOLOGISTS

The regular course in Medical Technology is offered during the Summer Session. No special arrangement for practical work can be made without the necessary prerequisites. See special bulletin on Medical Technology, or consult Dr. W. A. O'Brien, director of the Course for Medical Technologists of the University of Minnesota Hospitals.

COURSES FOR DENTAL STUDENTS

For appropriate courses in the laboratory sciences, dental students should consult the departmental statements which follow.

ANATOMY

FIRST TERM

61su. Histology and Embryology. Minute structure and development of the tissues and organs, with special emphasis upon the oral region and digestive tract. (6 cred.; fr. dent.; prereq. Zool. 1-2-3, Anat. 59; MTWThF I, II, III, MTWF IV, V; 102,215 IA.) Course fee $7.50, microscope fee $1.50. This course may also be taken for 5 credits with reduced laboratory work, as a substitute for Zoology 21, required for medical technologists. For this reduced course, the course fee is $5, microscope fee $1.50. Dr. Rasmussen and assistant.

100su. Gross Human Anatomy. Dissection of abdomen and lower extremity. Disarticulated skeletons issued for study of osteology. (9 cred.; 3rd yr. med.; prereq. Zool. 1-2-3; MTWThF I, II, III, MTWF IV,

MTWTh VI, VII, VIII; 304,306 IA.) Course fee $7.50. Class limited to 32. Application for admission must be made in advance to the Department of Anatomy. Dr. Boyden and assistants.

103su. Human Histology. Minute structure of the various tissues and organs. (9 cred.; 3rd yr. med.; prereq. Zool. 1-2-3, Anat. 100, 101; MTWThF I, II, III, IV, V, MWF VII, VIII; 102,215 IA.) Course fee $7.50, microscope fee $1.50. (Medical students are required to furnish their own microscopes.) Dr. Rasmussen and assistant.

111su. Human Neurology. Morphology of the central nervous system and sense organs. (6 cred.; 4th yr. med. and others; prereq. Anat. 103, 107; lect. daily 7:00 a.m., lab. MTWThF I, II, III; 102,214 IA.) Course fee $5, microscope fee $1.50. (Medical students are required to furnish their own microscopes.) Dr. Rasmussen and assistant.

156su. Advanced Anatomy. Individual problems in gross anatomy, histology, embryology, or neurology. Includes advanced work for clinical graduate students. Permission by instructor required. (Cred. and hrs. ar.) Course fee $1 per credit. Dr. Boyden, Dr. Rasmussen.

165su. Hematology. For medical technologists, medical and graduate students. Lecture and laboratory work. (5 cred.; prereq. Anat. 103 or equiv.; MTWThF VI, VII, VIII; 102,213IA.) Microscope fee $1.50. (Medical students are required to furnish their own microscopes.) Class limited to 45. Application should be made in advance at the Anatomy office. Dr. Jones and assistant.

204su. Research in Anatomy. Research work in gross or microscopic anatomy, histology, embryology, or neurology. Permission of instructor required. (Cred. and hrs. ar.) Dr. Boyden, Dr. Rasmussen.

SECOND TERM

101su. Gross Human Anatomy. Dissection of head, neck, thorax, and upper extremity. Continuation of 100su. (9 cred.; MTWThF I, II, III, MTWF IV, MTWThF VI, VII, VIII; 304,306 IA.) Course fee $7.50. Class limited to 32. Dr. Blount and assistants.

156su. Advanced Anatomy. See under first term, Course 156. Permission by instructor required. (Cred. and hrs. ar.) Course fee $1 per credit. Dr. Blount.

204su. Research in Anatomy. See under first term, Course 204. Permission of instructor required. (Cred. and hrs. ar.) Dr. Blount.

BACTERIOLOGY

FIRST TERM

41su. Principles of Bacteriology. (Page 19.*) (5 cred.; prereq. general chemistry and biology; MTWThF I, II, III; 214,201MH.) Course fee $1.50. Dr. Larson, Mr. Ordal.

* Page numbers in course descriptions refer to the Medical School Bulletin for 1937-39, where further information may be found.

116su. Immunity. (Page 20.*) (3 cred.; prereq. general bacteriology; MTThF II, III; 201MH.) Course fee $1.50. Dr. Larson.

201su. Research in Bacteriology. (Page 39.†) (Cred. and hrs. ar.) Dr. Larson.

SECOND TERM

102su. Medical Bacteriology. (Page 20.*) (4 cred.; prereq. general bacteriology; MTWThF VI, VII, VIII; 214,201MH.) Course fee $1.50, microscope fee $1.50. Dr. Henrici, Mr. Hoyt.

114su. Molds, Yeasts, and Actinomycetes. (Page 20.*) (3 cred.; prereq. general and special bacteriology; hrs. ar.; 201MH.) Dr. Henrici.

201su. Research in Bacteriology. (Page 39.†) (Cred. and hrs. ar.) Dr. Henrici.

MEDICINE

FIRST AND SECOND TERMS

Required Courses

30su. Clinic in Medicine. (22 hrs.; 6th yr., Divs. A, B, D; TTh 8:00-8:50; EMH and MGH.) Dr. Fahr and others.

35su.§ Clinical Clerkship in Medicine. The personal observation of patients in hospital; taking and recording of case histories; making of provisional diagnosis; and study of treatment. (200 hrs. cred.; 6th yr., sections of Div. A.) See special schedule. Staff.

35vsu. Admission Clerkship. Assignment to admission service, University of Minnesota Hospitals. Part of Medical clerkship. Dr. Wetherby.

35xsu. Same as 35 at the Minneapolis General Hospital. Dr. Fahr and staff.

35ysu. Physical Diagnosis and Therapy. Conducted with sections in the following dispensary clinics: (1) general medicine; (2) heart clinic; (3) chest clinic; (4) metabolism; (5) gastrointestinal clinic. Sixth year. Part of medical clerkship, Course 35.

35zsu. Clerkship Clinics in Tuberculosis. Glen Lake Sanatorium. Seniors in medical clerkship quarter. Dr. Mariette and staff.

Elective Courses

25su. Physical Diagnosis and Therapy. Conducted with sections in the following dispensary clinics: (a) general medicine; (b) cardiac and vascular diseases; (c) respiratory diseases and tuberculosis; (d) food; (e) gastrointestinal diseases. Elective for juniors in summer to the extent of facilities. See special schedule. Dr. Wetherby.

57su. Advanced Physical Diagnosis of the Chest. Practical dispensary work on tuberculous patients. Not less than 3 nor more than 6 students. Dr. Weisman.

* Page numbers in course descriptions refer to the Medical School Bulletin for 1937-39, where further information may be found.

† Page numbers in course descriptions refer to the Graduate School Bulletin for 1939-41, where further information may be found.

§ Course 35su or the separate parts thereof including Med. 44 and 47 will be open as electives to prepared students other than Division A seniors to the extent that facilities permit.

102su.¶ The Respiratory Organs in Health and Disease. For students who desire training in preparation of scientific papers for publication. The student selects a problem pertaining to some part of the respiratory tract, which he pursues independently or in collaboration with instructor. Limit, 5 students. (Cred. and hrs. ar.; 5th and 6th yr.) Dr. Myers.

105su.¶ Problems in Pathological Physiology. Experimental work. One to four students. (Problems and cred. ar.; soph.; hrs. ar.; laboratory of Pathological Physiology, MH.) Dr. Fahr, Dr. Watson, and staff.

106su.¶ Problems in Clinical Physiology. Experimental and clinical investigations of the pathological functions in cardiovascular, renal, gastrointestinal, and respiratory diseases. One to four students. (Problems and cred. ar.; jr., sr.; laboratory of Pathological Physiology, MH, MGH, UD.) Dr. Fahr, Dr. Watson, and staff.

203su.¶ Research in Medicine. (Cred. and hrs. ar.) Dr. Fahr.

Division of Dermatology

Required Courses

47su. Diagnosis and Therapy. Observation and study of cases in the University Dispensary and Minneapolis General Hospital; a part of medical clerkship, Medicine 35. (40 or 24 hrs. cred.; see special schedule, sections of sr. class; daily 1:00-3:00.) Dr. Michelson, Dr. Sweitzer, Dr. Lynch, Dr. Madden, Dr. Rusten.

Elective Courses

93su. Assistantship, Dermatology and Syphilis. (Prereq. medical clerkship; Minneapolis General Hospital.) One student. Dr. Winer.

94su. Assistantship and Conference in Dermatology. Prereq. medical clerkship and Med. 97; EMH, UD.) Dr. Michelson and staff.

97su. Therapy of Syphilis. (Prereq. medical clerkship, 1 student; daily 1:00-3:00 EMH.) Dr. Michelson, Dr. Laymon, Dr. Lynch.

Division of Nervous and Mental Diseases

Required Courses

44su. Nervous and Mental Diseases. Observation and study of cases in the University Dispensary; required of clerks in nervous and mental service at University of Minnesota Hospitals. (Credit included in clerkship, Medicine 35.) Dr. Baker, Dr. Gray, Dr. Schiele, Dr. Berkwitz.

Elective Courses

121su.§ Resident Clerkship in Psychiatry. Two weeks or more arranged at a state hospital. Dr. G. H. Freeman, Dr. Patterson, and staffs.

124su.¶ Advanced Neuropathology. Individual gross and microscopic studies on existing preparations in neuropathology. Limit, 2 students. (Cred. and hrs. ar.; prereq. Path. 102; 126MH.) Dr. Baker.

§ The dean's office will be glad to assist in making arrangements.
¶ Permission of instructor required.

125su.¶ Problems in Neuropathology. The student will be assigned a topic for special study. Limit, 2 students. (Cred. and hrs. ar.; prereq. Path. 102; 126MH.) Dr. McKinley, Dr. Baker.

FIRST TERM

130su. Introductory Psychiatry. (MTWThF 4:00-5:00 p.m.) Dr. Hinckley.

SECOND TERM

131su. Descriptive Neuropsychiatry. (MTThF 4:00-5:00 p.m.) Dr. Ruhberg.

OBSTETRICS AND GYNECOLOGY

FIRST AND SECOND TERMS

Required Courses

30su. Obstetrics and Gynecology Clinic. Lectures, class clinics, and case analysis of the pathology of obstetrics and gynecology. (22 hrs.; sr.; MF 8:00-8:50.) Dr. McKelvey, Dr. McLennan, and staff.

35su. Clinical Clerkship in Obstetrics and Gynecology. The study and care of assigned patients in the University of Minnesota Hospitals and Dispensary, Minneapolis, and Salvation Army Home, St. Paul; manikin practice, case histories, physical and laboratory examinations; parturition and bedside clinics, and operations. Includes 35xsu, 35ysu. (240 hrs.; selection of Div. B, sr.; prereq. Courses 20, 21, 22, 23; daily through either term, 9:00-5:00; EMH.) Dr. McKelvey and staff.

35xsu. Clinical Clerkship in Obstetrics and Gynecology. Part of Course 35su, but given at the Minneapolis General Hospital. (MTWThFS 9:00-5:00.) Dr. Lang, Dr. Simons, and staff.

35ysu. Residence in Obstetrics. Part of Course 35. (Ancker Hospital.) Dr. Barry and staff.

Elective Courses

50su. Gynecologic Clinic. Diagnosis and treatment of diseases of women. Limit, four students. (22 hrs.; F 1:00-3:00; Wilder Dispensary.) Dr. Hartley.

51su. Gynecologic Clinic. Limited to three junior or senior students. (T 6:00-7:00 p.m.; Lymanhurst.) Dr. Proshek and staff.

51asu. Same as 51su. (F 6:00-7:00 p.m.; Lymanhurst.) Dr. Proshek and staff.

OPHTHALMOLOGY AND OTOLARYNGOLOGY

FIRST TERM

36su. Clinic in Diseases of the Eye. Diagnosis and treatment of cases. Part of the required section clinics, surgical clerkship period. (35 hrs.; UD.) Dr. Burch, Dr. Macnie, Dr. Hansen, Dr. Hymes, Dr. Benkwitz, Dr. Tracht.

37su. Clinic in Diseases of the Ear. Diagnosis and treatment of cases. Part of section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Newhart, Dr. Fjeldstad, Dr. Delavan, Dr. Hilger, Dr. Loenholdt.

¶ Permission of instructor required.

38su. Clinic in Diseases of the Nose and Throat. Diagnosis and treatment of cases. Part of required section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Boies, Dr. Bryant, Dr. Hilger, Dr. Loenholdt.

Elective Courses

121su. Operative Clinic in Eye. Limited to six students. (12 hrs. cred.; Th 3:00-4:30; EMH.) Dr. Burch, Dr. Macnie, Dr. Hansen, Dr. Hymes.

123su. Operative Clinic in Ear, Nose, and Throat. Limited to six students. (13 hrs. cred.; F 3:00-4:30; EMH.) Dr. Newhart, Dr. Boies.

124su. Clinical Otorhinolaryngology. Demonstration of diagnosis and treatment of cases with special reference to the needs of the general practitioner. Classroom and bedside instruction. (Days ar.; 1:00-3:00.) Staff.

A didactic course in ophthalmology can be given (Dr. Macnie) during the Summer Session, if sufficient students desire it.

SECOND TERM

36su. Clinic in Diseases of the Eye. Diagnosis and treatment of cases. Part of the required section clinics, surgical clerkship period. (35 hrs.; UD.) Dr. Burch, Dr. Macnie, Dr. Hansen, Dr. Hymes, Dr. Benkwitz, Dr. Tracht.

37su. Clinic in Diseases of the Ear. Diagnosis and treatment of cases. Part of section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Newhart, Dr. Fjeldstad, Dr. Delavan, Dr. Hilger, Dr. Loenholdt.

38su. Clinic in Diseases of the Nose and Throat. Diagnosis and treatment of cases. Part of required section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Boies, Dr. Bryant, Dr. Hilger, Dr. Loenholdt.

Elective Courses

121su. Operative Clinic in Eye. Limited to six students. (12 hrs. cred.; Th 3:00-4:30; EMH.) Dr. Burch, Dr. Macnie, Dr. Hansen, Dr. Hymes.

123su. Operative Clinic in Ear, Nose, and Throat. Limited to six students. (13 hrs. cred.; F 3:00-4:30; EMH.) Dr. Newhart, Dr. Boies.

124su. Clinical Otorhinolaryngology. Demonstration of diagnosis and treatment of cases with special reference to the needs of the general practitioner. Classroom and bedside instruction. (Days ar.; 1:00-3:00.) Staff.

A didactic course in Ophthalmology can be given (Dr. Macnie) during the Summer Session, if sufficient students desire it.

PATHOLOGY

FIRST TERM

107su. Surgical Pathology with Special Attention to Tumors. This course is intended for those specializing in pathology or surgery. (6 cred.; MTWThF 8:00-10:30 a.m.) Dr. McCartney.

FIRST AND SECOND TERMS

104su. Autopsies. Post-mortem technique; examination of fresh organs, etc. (Cred. and hrs. ar.; prereq. 101; 110 IA.) Staff.

109su. Clinical Pathological Conference. Presentation of clinical data on selected cases and of the pathological specimens from the same, with discussions of etiology and diagnosis. Required in clerkship period. Elective for others. (1 cred.; F 4:00-4:50; 104 IA.) Staff.

109xsu. Clinical Pathological Conference. (Elective; Th 11:30-12:30; MGH.) Staff.

111su. Conference on Autopsies. (1 cred.; T 12:30 to 2:00 p.m.; 104 IA.) Staff.

201su. Research. Students of the necessary preliminary training may elect research, either as major or minor in pathology. Permission required. (Cred. and hrs. ar.) Dr. Bell, Dr. Clawson, Dr. McCartney, Dr. Noble.

NOTE.—All courses may be taken either or both terms.

PEDIATRICS

FIRST AND SECOND TERMS

Required Courses

30su. Amphitheater Clinic. Detailed consideration of diagnoses, prognosis, prophylaxis, and treatment in individual clinical cases representing all phases of pediatric practice. (Sr. and other prepared students; S 8:00-9:00 a.m.; Eustis Amphitheater.) Dr. McQuarrie and senior staff.

35su. Clinical Clerkship in Pediatrics. Patients in the pediatric wards, dispensaries, and special clinics are assigned to individual students for history taking, complete examination, treatment, and "follow-up" observation under supervision. Bedside clinics for one hour daily. One sixth of class on pediatric clerkship at one time, part of work at the University of Minnesota Hospitals, the other part at the Minneapolis General Hospital. Required time for each student, daily from 9:00 a.m. to 5:00 p.m. for 6 weeks. Dr. McQuarrie, Dr. Clarke, Dr. C. A. Stewart, Dr. Stoesser, and staffs.

*Elective Courses**

106su.† Advanced Study of Noncontagious Diseases. Both clinical and experimental subject-matter included. Dr. McQuarrie, Dr. Hansen, Dr. Anderson.

108su.† Advanced Study of Contagious Diseases. Dr. Platou.

112su.† Common Behavior Disturbances in Childhood—Their Recognition and Management. Dr. Clarke, Dr. Lippman, Dr. Jensen.

116su.† Weekly Seminar for Detailed Discussion of Fundamental Subjects Related to Pediatrics. Dr. Ziegler.

208su. Pediatric Research. Special problems in the various subdivisions of the pediatric field may be selected for study. Students may collaborate with members of the staff or with other students where suitable arrangements can be made. Dr. McQuarrie.

* Time and credit to be arranged with Dr. McQuarrie.
† Not offered to fewer than ten students.

PHARMACOLOGY

FIRST AND SECOND TERMS

8su. Elementary Pharmacology. (Page 22.*) (3 cred.; prereq. Anat. 3, Physiol. 2; MW VI-VIII incl.; lect. 113MeS.; lab. 101MH.) Dr. Wright.

109su. Pharmacological Problems. (Page 23.*) (3 cred. or ar.; soph. or higher class medical students, grad., or other students; prereq. physiology or equiv.; 3:00-6:00 p.m., or ar.; 132MH.) Course fee $1 per credit. Dr. Hirschfelder, Dr. Wright.

203su. Research in Pharmacology. (Page 23.*) (Cred. ar.; grad. and adv. students; permission required; 132MH.) Dr. Hirschfelder, Dr. Wright.

FIRST TERM

108su. Prescription Writing. (Page 22.*) (1 cred.; soph. or higher class medical students, grad. or other students; prereq. physiology or equiv.; hrs. ar.; 102MH.) Dr. Wright.

115su,115xsu. General Pharmacology for Medical and Dental Students. (Page 22.*) (115su equivalent to 101w and 102s; 115xsu equivalent to 54w) (115su, soph. or higher class medical students, grad. or other students; prereq. physiology or equiv.; course fee $5 per term; 115xsu, jr. or higher class dental students; prereq. physiology or equiv.; course fee $2 per term; MTWThF V-VIII incl. or ar.; 101MH.) Dr. Hirschfelder, Dr. Wright.

SECOND TERM

105su. General Pharmacology. (Page 22.*) (2 cred.; jr. medical students; prereq. 102; hrs. ar.; 102MH.) Dr. Wright.

106su. General Pharmacology. (Page 22.*) (2 cred.; jr. medical students; prereq. 102, 105; hrs. ar.; 102MH.) Dr. Wright.

PHYSIOLOGY

FIRST TERM

4su. Human Physiology. An elementary course consisting of lectures and demonstrations for students desiring an introduction to the subject. (4 cred.; prereq. high school or college biology and chemistry; lect. and dem. MTWThF I, II; 113MeS.) Course fee $2. Dr. King and assistant.

58-59su. Human Physiology. An introductory course for academic, dental, and other students, lectures and laboratory. (6 cred.; prereq. college chemistry and human anatomy or zoology; lect. rec., and dem. MTWThF I, II, 113MeS; lab. MTWF III, IV, and TTh VI, VII, VIII; 301MH.) Course fee $5. Dr. King and assistant.

100su. Physiological Chemistry. An advanced course for upper division medical and graduate students. Applications of physiological chemistry

* Page numbers in course descriptions refer to the Medical School Bulletin for 1937-39, where further information may be found.

to biological problems and the metabolism of carbohydrates and fats. (7 cred.; prereq. organic chemistry and physics; lect. MTWThF I, IV, 15MeS; lab. MTWThF II, III, 310MH.) Course fee $7.50. Lectures only, 5 cred., may be registered for as 100xsu; laboratory only as 100ysu. Dr. Hemingway, Dr. Samuels.

103su. Physiology. An advanced course for medical, graduate, and other qualified students, covering general physiology, the functions of neuromotor apparatus, circulation, and respiration. (8 cred.; prereq. organic chemistry and zoology; lect. MTWThF I, II, 12MeS; rec. TF III; lab.* MW III, IV, V, TThF IV, V; 301,315MH.) Course fee $7.50. Lectures only, 5 cred., may be registered for as 103xsu. Dr. Scott, Dr. Code, and assistant.

113su.‡ Physiology and Physiological Chemistry of the Endocrine Glands. Intensive survey of our present knowledge of endocrinology with lectures, discussions, laboratory, and assigned reading, limited to 20 qualified students. Advance registration will be necessary. (3 or 4 cred.; depending on whether or not registration includes laboratory work; prereq. organic chemistry and vertebrate zoology or equiv.) Dr. Samuels.

203su. Research in Physiology. (Cred. and hrs. ar.) Dr. Scott, Dr. King.

205su. Research in Physiological Chemistry. (Cred. and hrs. ar.) Dr. Hemingway, Dr. Samuels.

SECOND TERM

101su. Physiological Chemistry. Continuation of 100su. Metabolism of nitrogenous materials, digestion, endocrinology, and inorganic metabolism. (6 cred.; prereq. 100; lect. MTWThF I, IV, 214MH; lab. MTWThF II, III, 310MH.) Course fee $7.50. Lectures only, 4 cred., may be registered for as 101xsu; laboratory only, as 101ysu. Dr. Armstrong, Dr. Arnow.

104su. Physiology. Continuation of 103, covering the nervous system and senses, endocrines, metabolism, nutrition, digestion, and renal function. (7 cred.; prereq. 103 or organic chemistry and neurology; lect. MTWThF I, II, 12MeS; rec. TF III; lab. MW III, IV, V, TThF IV, V; 301,315MH.) Course fee $7.50. Lectures only, 5 cred., may be registered for as 104xsu. Dr. Code, Dr. Kabat, and assistant.

205su. Research in Physiological Chemistry. (Cred. and hrs. ar.) Dr. Armstrong.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

FIRST TERM

53su. Elements of Preventive Medicine. Susceptibility, resistance, and immunity to disease; methods of spread and prevention of communicable and degenerative diseases; sanitation of the environment; proper types and protection of food, water, and milk. (5 cred.; prereq. Bact. 41 or

* Students who find it more convenient may do part of their laboratory work in the afternoon.

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

equiv., or by permission; public health nurses and medical social workers; MTWThF I-II; 111MeS.) Dr. Anderson.

55su. Nursing and Social Problems in the Control of Gonorrhea and Syphilis. History, prevalence, and epidemiology of gonorrhea and syphilis, public health control measures; individual and family problems resulting from these diseases. Provision will be made for conferences and case discussions. (2 cred.; prereq. 53 and 62 or Soc. 90 or 109; may be taken simultaneously with any of these prerequisites; MTWThF II; *) Mrs. Goldberg.

60su. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States. Early diagnosis and treatment. Tuberculosis in children. The psychology of tuberculosis, supervision of returned sanatoria patients. State program for the eradication of tuberculosis; legislation. (2 cred.; jr., sr.; prereq. 50, 52, or 53; MTWF IV; *) Dr. Myers.

76su. Field Practice with Family Health Agency. Lectures, demonstrations, and supervised experience in prenatal and infant clinics and in home visiting. This includes bedside care of all types of cases, with emphasis on promotion of physical and mental health and recognition of social problems. (Cred. ar.; 8-11 weeks; public health nurses; prereq. 62, registration limited and only by prior arrangement with department.) Miss Arnstein, Miss Draper.

101su. Public Health Administration and Field Work. Demonstrations of health agencies at work; boards of health, laboratories, filtration, pasteurization, and garbage disposal plants. Presentation of actual health problems. (2 cred.; groups of 10 to 15 medical students for 6 weeks. (18 hrs.); sr. medics; prereq. 100 hrs., see clerkship schedule, Medical School.) Dr. Anderson and staff.

106su. Public Health Administration. Structure, basic functions, and activities of public health agencies; public health laws and regulations; administrative procedures in public health practice ; relationship to other governmental and social activities. (For physicians, engineers, nurses, social workers, and others by arrangement.) (3 cred.; prereq. 53, 100, 109, or equiv. or to be taken simultaneously with any of these prereq.; MTWThF III; *) Dr. Anderson.

200su. Research. Opportunities will be offered by the University and by the various co-ordinated organizations for qualified students to pursue research work. (Cred. ar.; grad.) Dr. Anderson and staff.

Biometry

FIRST TERM

110su. Biometric Principles. An introduction to statistical analysis with emphasis on the basic principles of statistical reasoning, the description of univariate distributions, normal correlations, simple tests of significance, and goodness of fit. Course 111 will be taken concurrently. (3 cred.; prereq. 18 cred. in biol. sci. or math. through anal. geom.; MTWThF I; 118MH.) Mr. Treloar.

* Room schedule posted in 121 Millard Hall.

111su.‡ Biostatistics Laboratory. Practical training in machine calculation and statistical techniques discussed in Course 110. (2 cred.; lab. 10 hrs. ar.; 118MH.) Mr. Treloar.

140su.‡ Topics in Biometry. Reference reading and laboratory work in special subjects as advanced students may require them. (3 cred.; sr., grad.; prereq. 120 and 130 or consent of instructor; hrs. ar.; 118MH.) Mr. Treloar.

SECOND TERM

60su. Tuberculosis and Its Control. Same as first term.

62-63su. Principles and Special Fields of Public Health Nursing. History and development of public health nursing, a study of the underlying principles of organization, administration, and service, and their application in a program of individual and family health supervision in the specialized fields such as maternal and infant welfare, preschool, school, tuberculosis, and industrial nursing. (6 cred.; public health nurses; prereq. 53 or equiv. but may be taken with 53. Students who have previously taken Course 62 or equivalent course in principles of public health nursing but wish to take 63 must register for Courses 63 and 171; MTWThF II-III; *) Miss Arnstein, Miss Palmer.

81su. School Health Problems. Problems of providing health supervision of school children; evaluation of different programs, development of school health services as part of health instruction. (3 cred.; MTWThF I; *) Instructor to be announced.

76su. Field Practice with Family Health Agency. Limited to those students who have begun such work during the first term.

101su. Public Health Administration and Field Work. Same as first term.

171su. Advanced Problems in Public Health Nursing. For experienced public health nurses. Will include a discussion of advanced problems dealing with administrative practice, organization, and the establishment of relationships with medical and community groups, etc. (3 cred.; public health nurses; prereq. 53, 61, 62; experience in public health nursing or permission of instructor; to be elected only in conjunction with Course 63; MTWThF I; *) Miss Arnstein.

200su. Research. Same as first term.

SURGERY

FIRST AND SECOND TERMS

Required Courses

30su. Surgical Clinic for Seniors. Amphitheater clinic. (Sr.; 55 hrs.) Surgery staff.

35su. Clinical Clerkship. The individual study of assigned patients; case histories, laboratory examinations, provisional diagnoses with suggestions as to therapy; attendance at operation and observation of postoperative management. (Sr. 300 hrs.; EMH, MGH.) Surgery staff.

* Room schedule posted in 121 Millard Hall.

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

35asu. Clinical Pathology of Tumors. A combined clinical and pathological consideration of tumors. Insofar as available material permits, a systematic presentation of the manifestations and effects of malignant tumors which come in the province of general surgery and its divisions. Parts of Course 35. Surgery staff.

35bsu. Reading Course. A weekly recitation during the clerkship on assigned reading in a standard textbook of surgery. Quiz and lecture. Part of Course 35. Surgery staff.

35csu. Surgical-Pathological Conference. A review of the gross and microscopic findings of surgical specimens removed during the preceding week; also an attempt will be made to review systematically some of the aspects of surgical pathology which are of especial importance to surgeons. Part of Course 35. Surgery staff.

35dsu. Roentgenological-Surgical Conference. The films of all surgical patients presenting interesting roentgen findings are reviewed. Part of Course 35 (see also Radiology program). Radiology and Surgery staffs.

35esu. Surgical Conference. Cases presenting interesting problems are presented and discussed. Part of Course 35. Surgery staff.

35fsu. Anesthetics. Administration of anesthetics under supervision. Part of Course 35. (EMH.) Dr. Knight and others.

35gsu. Outpatient Surgical Clinic, Including Minor Surgery and Proctology. Sections daily in the Outpatient Department. Part of Course 35. Dr. Wangensteen, Dr. Peyton, Dr. Bratrud, Dr. W. A. Hanson, Dr. Leven, Dr. McKinney, Dr. Paine, Dr. J. K. Anderson, Dr. Rea, Dr. W. P. Ritchie, Dr. Sperling.

35hsu. Clerkship on Fractures. Under the supervision of the hospital staff the student participates in the care of fractures. Part of Course 35 (MGH.) Surgery staff.

35isu. Practical Laboratory Surgery. Class divided into operating teams and perform selected operations with aseptic technique upon the dog. Surgical staff.

268su. Applied Surgical Anatomy. Exercises in surgical anatomy upon the cadaver. Surgical staff.

Elective Courses

52su. Diagnosis of Tumors. Study, in the Outpatient Department, of patients with malignant diseases. (22 hrs.) Dr. Peyton and others.

53su. Problems in Clinical Investigation. A study of special case records correlated with literature study. (Cred. and hrs. ar.) Dr. Wangensteen, Dr. Creevy, Dr. Peyton, Dr. Paine.

67su. Problems in Experimental Surgery. Students under supervision will investigate problems assigned to them. As their experience increases they are permitted to do the operations incident to their problems. (Cred. and hrs. ar.; prereq. Surg. 53.) Dr. Wangensteen, Dr. Creevy, Dr. Peyton, Dr. Paine.

Division of Neurosurgery

Required Courses

62su. Outpatient Clinic in Neurosurgery. Opportunity is here afforded for examination and observation of patients with surgical diseases of the nervous system before and after operation. Senior year. Part of Course 35. Dr. Peyton and associates.

63su. Clinical Clerkship in Neurosurgery. Cases admitted for observation and operation will be assigned to students for study. Senior year. Part of Course 35.

Elective Course

64su. Head Injuries. Junior or senior year. (11 hrs.; MGH.) Dr. Zierold and associates.

Division of Orthopedic Surgery

Required Course

45su. Orthopedic Outpatient Clinic. A part of required section clinics. Three times weekly. Senior year. A part of Course 35. Orthopedic surgery staff.

Division of Urology

Required Courses

48su. Cystoscopic Clinic. Demonstration of cystoscopy. Seniors. Part of Course 35. Dr. Giere, Dr. Meland, Dr. Olson.

49su. Outpatient Clinic in Urology. The observation, examination, and treatment of patients. Seniors. Part of Course 35. Urology staff.

Division of Anesthesia

Required Course

35su. Individual Instruction in Anesthesia. Part of surgical clerkship, Surgery 35. Dr. Knight and others.

Elective Course

36su. Case Problems in Anesthesia. Time arranged with instructor. Limited to two students. Dr. Knight.

X RAY

FIRST AND SECOND TERMS

Required Course

35x,y,zsu is offered as part of clerkships in Medicine, Pediatrics, and Surgery (see Bulletin of the Medical School).

Elective Courses

85su. Plate Reading. Limit 4 students. (Cred. and hrs. ar.; jr. or sr.; EMH.) Dr. Rigler and others.

88asu. X-Ray Diagnosis. Four to 10 students. (22 hrs.; jr. or sr.; M 9:00-11:00; MGH.) Dr. Ude.

88bsu. X-Ray Diagnosis. Four to 10 students. (11 hrs.; jr. or sr.; W 1:00-2:00 p.m.; EMH.) Dr. M. B. Hanson.

95su. Clinic in X-Ray Therapy. (Hrs. ar.; jr. or sr.; EMH.) Dr. Stenstrom.

101su. Surgical-Roentgenological Conference. Part of Surg. 35. For surgical clerks and graduate students. Dr. Rigler.

103su. Physical Therapy Clinic. (Cred and hrs. ar.; T.) Dr. Cook.

107su. Medical-Roentgenological Conference. Part of Med. 35. For medical clerks and graduate students. Dr. Rigler.

108su. Pediatric-Roentgenological Conference. For pediatric clerks and graduate students. Dr. Rigler.

200su. Research in Roentgen Diagnosis. (Cred. and hrs. ar.) Dr. Rigler.

205su. Research Related to Radiation Therapy. (Cred. and hrs. ar.) Dr. Stenstrom.

207su. Roentgen and Radium Therapy. Treatment of patients under supervision both with medium and high voltage machines and with radium. Problems in connection with these treatments will be thoroly discussed. (Cred. and hrs. ar.) Dr. Stenstrom.

NURSING INSTRUCTION

FIRST TERM

Courses for graduate nurses. See also courses in Preventive Medicine and Public Health.

53su. Nursing Jurisprudence. Philosophy of law making; history, mechanisms, present status, and goals of nursing legislation; administration of nursing laws. (2 cred.; TTh VI-VII.) Instructor to be announced.

60su. Ward Administration. Principles of administration and their application to ward management. A study of the opportunities for clinical teaching through efficient ward administration. (4 cred.; MTWTh I-II.) Miss Hodgkins.

69su. A Study of Conditions and Trends in Nursing. A study of conditions existing in nursing as revealed in literature and various reports. An attempt to define tendencies in nursing with a view to designating those which appear most favorable to social progress. (3 cred.; MWF VI-VII.) Miss Densford.

72su. 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. (5 cred.; MTWThF III, MTWF IV.) Miss Petry.

SCHOOL OF DENTISTRY

FIRST AND SECOND TERMS

Courses will be offered in the School of Dentistry as follows:

Clinical Practice. Clinical work will be offered in each of the following divisions under the direction of the division chairman: Crown and Bridge Work, Dr. Wells; Operative Dentistry, Dr. Green; Orthodontia, Dr. Rudolph; Prosthetic Dentistry, Dr. Flagstad; Oral Surgery, Dr. Griffith; Major Oral Surgery of the Mouth and Jaws, Dr. Waldron. (Jr., sr., grad.; MTWThF 9:00-12:00 a.m., and 1:30-4:30 p.m.)

Fees: full time, $30; half time, $15, for each term. In addition each student pays an incidental fee of $3.20, and a general deposit fee of $5.‡

Courses in contributing departments are announced elsewhere in this bulletin. See particularly Anatomy, Bacteriology and Immunology, Pathology, Pharmacology, Physiology.

‡ Student registering for half time in dentistry and for part time in other departments will not be required to duplicate the incidental fee.

COLLEGE OF EDUCATION

Courses in the College of Education presuppose completion of Junioı College requirements in the University of Minnesota or the equivalent in colleges of similar grade elsewhere. Graduation from the advanced course of Minnesota state teachers colleges is accepted as equivalent. Students with this training may be admitted to any course for which they have satisfied the prerequisite as stated under each course.

For all general matters relating to admission, advanced standing, credits, honor points, curricula, and requirements for graduation, students should consult the College of Education Bulletin for the years 1938-40. Students expecting to become candidates for a degree should seek as early as possible the advice of the major adviser in the department concerned in order to learn the requirements of the special curriculum they will need to complete.

SUMMER DEMONSTRATION HIGH SCHOOL

The University High School will be in session during the first term of the Summer Session. Instruction will be offered in English, mathematics, general science, chemistry, physics, biology, history, social studies, shorthand, typing, and other high school subjects. The school is a six-year high school comprising grades seven to twelve. The courses will be organized to provide individual attention to the needs and capacities of the pupils.

Admission to the Summer Session is open to any pupil of normal high school age. Children of teachers or other professional workers who are attending the Summer Session of the University are especially welcomed in the summer term of the University High School. For information regarding fees and registration procedure, address the Principal's Office, University High School, Minneapolis, Minnesota.

Students registered in Ed.T. 52su will be assigned to observation and directed teaching in the classes of the high school. The facilities of the school are available to the college classes in special methods and in other courses for demonstration purposes. (MTWThF I, II, III, IV.)

SUMMER DEMONSTRATION ELEMENTARY SCHOOL

An elementary school, grades one to six inclusive, will be in operation during the first term of the Summer Session. This school will be staffed by the principal and teachers of the Tuttle School and the demonstration elementary school of the College of Education, by a co-operative agreement with the Board of Education of the city of Minneapolis. The school will be conducted on an activity basis and may be observed by students of elementary school methods and supervision. (MTWThF I, II, III, IV; Tuttle School, Talmadge Street and Eighteenth Avenue S.E.)

NURSERY SCHOOL AND KINDERGARTEN

The training facilities of the Institute of Child Welfare are available in the first term of the Summer Session. Courses listed on pages 102 and 115 are given for teachers wishing to take advantage of offerings in nursery school and kindergarten training.

MINIMUM FEE FOR GRADUATE STUDENTS

Graduate students who have completed all their graduate work with the exception of their thesis will be allowed to register for the Summer Session for thesis work only upon the payment of a fee of $5 plus a $2 deposit.

DETAILED DESCRIPTION OF COURSES

For detailed description of courses and curricula in education see the College of Education Bulletin for the years 1938-40.

NOTICE CONCERNING STARRED COURSES

Graduate students who wish to work on individual problems to count toward the nine credits in problems courses required for the Master's degree under Plan B, may register for this credit in any course starred in the following list. Other students taking these courses will not be held to the same quality of individual problems work, nor will written reports always be required of them.

GENERAL COURSES

FIRST TERM

Ed.51Asu.† Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWThF VI; 204bUHS.) Mr. Hagen.

Ed.51Bsu.†‡ Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51A or consent of instructor; MTWThF I; 114UHS.) Mr. Tyler.

Ed.51Csu.† Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51B or consent of instructor; MTWThF VI; 204aUHS.) Mr. Cooper.

Ed.61Asu.§ Introduction to Elementary School Teaching. (3 cred.; prereq. 6 cred. in psy.; MTWThF VI; 204bUHS.) Mr. Hagen.

Ed.104su. Adult Education. (3 cred.; jr., sr., grad.; MTWThF II; 206WeH.) Mrs. May.

Ed.125su. Philosophy of Education. (3 cred.; prereq. 9 cred. in ed.; MTWF IV and 1 hr. ar.; 204bUHS.) Mr. Kotschnig.

Ed.131su. Comparative School Systems. (3 cred.; prereq. 9 cred. in ed.; MTWThF II; 209EdH.) Mr. Kotschnig.

Ed.133su. Guidance in Secondary Schools. (3 cred.; sr., grad.; prereq. 9 hrs. in ed.; MTWThF I; 206WeH.) Mr. Wrenn. (See also Ind. 110.)

Ed.167su. Junior High School. (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51; MTWThF III; 204bUHS.) Mr. Cooper.

Ed.225su. Seminar in Elementary School Problems. (No cred.; prereq. consent of instructor; F V; 210Bu.) Mr. Brueckner. Mr. Bond.

† The entire course including the final examination covering all units must be successfully completed before credit is received for any quarter.

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

§ The entire course (Ed. 61A,B,C) including the final examination covering all units must be successfully completed before credit is allowed for this course.

Ed.228su.* Problems in Higher Education. (Cred. ar.; grad.; prereq. consent of instructor; ar.; ar.) Mr. McConnell.

Ed.233su.* Problems in Guidance and Personnel Work. (Cred. ar.; grad.; prereq. consent of instructor; ar.; ar.) Mr. Wrenn.

Ed.251su. Curriculum and Instruction in Higher Education. (3 cred.; prereq. 15 hrs. in ed.; MTWF IV and 1 hr. ar.; 115aUHS.) Mr. McConnell.

Ed.285su. Professional Education of Teachers. (3 cred.; grad.; prereq. 15 hrs. in ed.; MTWThF I; 205bUHS.) Mr. Carlson.

Ed.Wsu.¶ Professional Preparation for Teaching. (Minimum of 45 cred.; prereq. consent of Mr. Morse, course adviser.)

SECOND TERM

Ed.51Asu.† Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWThF III; 100Pt.) Mr. Drake.

Ed.51Bsu.† Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51A or consent of instructor; MTWThF I; 202EdH.) Mr. Tyler.

Ed.51Csu.† Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51B or consent of instructor; MTWThF II; 204bUHS.) Mr. Eggertsen.

Ed.61Asu.§ Introduction to Elementary School Teaching. (3 cred.; prereq. 6 cred. in psy.; MTWThF III; 100Pt.) Mr. Drake.

Ed.73su. Educational Sociology. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWF IV and 1 hr. ar.; 204bUHS.) Mr. Eggertsen.

Ed.101su. Historical Foundations of Modern Education. (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.; MTWThF I; 11F.) Miss Alexander.

Ed.103su. History of Modern Elementary Education. (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.; not open to students who have had Ed. 71; MTWThF II; 11F.) Miss Alexander.

Ed.133su. Guidance in Secondary Schools. (3 cred.; sr., grad.; prereq. 9 hrs. in ed.; MTWThF I; 106Pt.) Miss Edwards.

Ed.167su. Junior High School. (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51; MTWThF III; 204bUHS.) Mr. Carlson.

Ed.233su.* Problems in Guidance and Personnel Work. (Cred. ar.; grad.; prereq. consent of instructor; ar.; ar.) Miss Edwards.

Ed.286su.* Problems in Teacher Training. (3 cred.; grad.; prereq. 15 cred. in ed. including Ed. 285 or permission of instructor; MTWThF I; 205bUHS.) Mr. Carlson.

* See Notice Concerning Starred Courses, p. 91.

† The entire course including the final examination covering all units must be successfully completed before credit is received for any quarter.

§ The entire course (Ed.61A,B,C) including the final examination covering all units must be successfully completed before credit is allowed for this course.

¶ This course is designed for students already holding a baccalaureate degree and desiring to complete their preparation for teaching. Such students should consult the adviser, and outline for approval a program covering at least three quarters' study for completion of work for a teacher's certificate. The entire course, including the final examination, must be completed successfully before credit is given for any quarter.

AGRICULTURAL EDUCATION

FIRST TERM

Agr.Ed.137su. Course of Study Construction in Agriculture. A lecture and clinical laboratory course designed to aid teachers in constructing courses of study appropriate to the needs of local communities. Consideration of principles for the selection, distribution, and organization of the subject-matter for the integrated course of study in agriculture. (Cred. ar.; grad.; MTWThF VI-VII; 102Ad(UF).) Mr. Field, Mr. Ekstrom, Mr. Harden, Mr. Raine.

Agr.Ed.232su.* Research in Agricultural Education. Introduction to investigational work in problems of teaching agriculture in the high schools. Experience in selecting programs, preparation of bibliographies, analyzing and interpreting data, and preparing manuscripts. (1 to 9 cred.; grad.; lect. hrs. and individual work ar.; 209Ad(UF).) Mr. Field, Mr. Ekstrom.

Agr.Ed.237su. Adult Education in Agriculture. The organization, objectives, and techniques for conducting evening schools and part-time schools for farmers and out-of-school youth. (2-3 cred.; grad.; MTWF IV and 1 hr. ar.; 102Ad(UF).) Mr. Field, Mr. Raine.

Agr.Ed.286su. Special Problems in Agricultural Education. Analysis and discussion of special problems in planning and directing farm practice work. Opportunity for intensive study of the objectives, the organization, and planning activities for the Future Farmers of America. (Cred. ar.; grad.; MTWThF III; 102Ad(UF).) Mr. Ekstrom.

ART EDUCATION

FIRST TERM

Courses in art education have been planned on the assumption that art is a way of life and is related to all the ordinary experiences of life. Art interest is a widespread human characteristic, not the province of a few unusually gifted persons. Since an understanding of art so conceived should be a fundamental component of a school or college curriculum, the courses in this department will be of value to many teachers besides those working directly in the field.

ArtEd.4-6-8su. (Group C) Exploratory Experiences in Drawing and Painting. (3 cred.; MTWThF I-II; 203aJ.) Mr. Hilpert.

ArtEd.24-26-28su. (Group C) Water Color and Drawing. (3 cred.; MTWThF I-II; 203J.) Mr. Hilpert.

ArtEd.61-62-63su. (Group C) Individual Problems in Drawing and Painting. (3 cred.; MTWThF VI-VII; 203aJ.) Mr. Ziegfeld.

ArtEd.70,71, or 72su. (Group A) Fundamental Experiences in Design. (3 cred.; MTWThF III, MTWF IV, and 1 hr. ar.; 207bJ.) Mr. Hilpert.

ArtEd.73,‡74,‡ or 75su.‡ (Group B) Materials and Processes of Crafts and Activity Programs. (3 cred.; MTWThF VI-VII; 10J.) Miss Berglund.

* See Notice Concerning Starred Courses, p. 91.

‡ A fee of $1.50 per term is charged for this course.

ArtEd.76su.‡‡ (Group B) Textile Materials and Simple Weaving. (3 cred.; MTWThF III, MTWF IV, and 1 hr. ar.; 11J.) Miss Berglund.

ArtEd.153su. (Group D) Art in Society—The Home. (3 cred.; MTWThF VI-VII; 207bJ.) Mr. Faulkner.

ArtEd.185su. (Group E) Types of Art Instruction. (3 cred.; MTWF IV and 1 hr. ar.; 207aJ.) Mr. Ziegfeld.

See also Ed.Psy. 180su. Esthetics in Education.

SECOND TERM

ArtEd.4-6-8su. (Group C) Exploratory Experiences in Drawing and Painting. (3 cred.; MTWThF VI-VII; 203aJ.) Mr. Torbert.

ArtEd.24-26-28su. (Group C) Water Color and Drawing. (3 cred.; MTWThF V-VI; 203J.) Mr. Torbert.

ArtEd.61-62-63su. (Group C) Individual Problems in Drawing and Painting. (3 cred.; MTWThF VI-VII; 203aJ.) Mr. Torbert.

ArtEd.70,71, or 72su. (Group A) Fundamental Experiences in Design. (3 cred.; MTWThF II-III; 207bJ.) Mr. Torbert.

CURRICULUM AND INSTRUCTION

FIRST TERM

Ed.C.I.102su.‡ Contents and Activities of the Social Studies in the Elementary Grades. (3 cred.; prereq. Ed. 61A,B,C, or equiv.; MTWThF II; 106Pt.) Miss Rogers.

Ed.C.I.103su. The Study and Teaching of History. A training course for teachers with adaptations to stages of school instruction from the first grade through the high school. Illustrations will be drawn from world history, including Latin America and Canada, but the chief emphasis will be upon the history of the United States. (3 cred.; sr., grad.; prereq. 9 hrs. in ed.; MTWF IV and 1 hr. ar.; 207VH.) Mr. Johnson.

Ed.C.I.104su. The Literature of American History. Training in the finding and use of sources and in the appraisal of historians, with special emphasis upon recent literature, including the literature of current events. (3 cred.; sr., grad.; prereq. 9 hrs. in ed.; MTWThF III; 105VH.) Mr. Johnson.

Ed.C.I.105su.‡ Visual Aids in Teaching. (3 cred.; jr.. sr., grad.; MTWThF III; 101WeH.) Miss Clark.

Ed.C.I.107su.‡ Radio in Education. (3 cred.; MTWThF III; 202EdH.) Mr. Tyler.

Ed.C.I.110su. Education of Handicapped Children. (3 cred.; prereq. Ed. 51A or equiv.; MTWThF I; 201WeH.) Mr. Rockwell.

Ed.C.I.113su. High School Curriculum. (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51 or equiv.; MTWThF I; 206Pt.) Mr. Bossing.

Ed.C.I.119su.‡ Elementary School Curriculum. (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.; MTWThF III; 201WeH.) Mr. Bond.

‡ A fee of $1 per credit is charged for this course.
‡‡ A fee of $1.50 per term is charged for this course.

Ed.C.I.130su. Problems of Childhood Education. (2 cred.; sr., grad.; prereq. 9 cred. in ed.; including Ed.T. 55 or equiv.; MTWF IV; 100Pt.) Mrs. Foster.

Ed.C.I.143su.‡ Teaching of Reading in the Elementary School. (3 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. including Ed. 61A or equiv.; MTWF IV and 1 hr. ar.; 206WeH.) Miss Clark.

Ed.C.I.145su.‡ Remedial Reading. (3 cred.; prereq. Ed.C.I. 143 or 144 or 159; MTWThF II; 201WeH.) Mr. Bond.

Ed.C.I.148su.‡ The Teaching of Primary Arithmetic. (3 cred.; sr., grad.; prereq. Ed. 61 A, B, C, or equiv.; not open to students who have had Ed.T. 54b; MTWThF I; 204aUHS.) Mr. Grossnickle.

Ed.C.I.149su.‡ The Teaching of Intermediate Grade Arithmetic. (3 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.; MTWThF II; 204aUHS.) Mr. Grossnickle.

Ed.C.I.150su.‡ Supervision and Improvement of Instruction. (3 cred.; sr., grad.; prereq. Ed. 51C or equiv.; MTWF IV and 1 hr. ar.; 209EdH.) Mr. Brueckner.

Ed.C.I.151su.‡ Diagnostic and Remedial Instruction. (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.; MTWThF I; 106Pt.) Mr. Thiele.

Ed.C.I.160su. Supervision of Elementary Subjects. (3 cred.; sr., grad.; prereq. Ed.C.I. 150; MTWThF VI; 209EdH.) Mr. Brueckner and others.

Ed.C.I.162su.‡ Significance of Progressive Education. (3 cred.; sr., grad.; MTWThF III; 106Pt.) Mr. Thiele.

Ed.C.I.169su. Extra-curricular Activities. (3 cred.; prereq. 10 hrs. in ed. including Ed. 51A; MTWThF II; 206Pt.) Mr. Bossing.

Ed.C.I.170su. Curriculum and Course of Study Construction. (3 cred.; sr., grad.; prereq. 15 hrs. in ed.; MTWThF VI; 210Bu.) Miss Cutright.

Ed.C.I.171su. Curriculum Laboratory Practice. An advanced course for educational workers engaged in curriculum development. (2 to 4 cred.; sr., grad.; prereq. 15 hrs. in ed. including Ed.C.I. 113 or 119; MTWThF VI; 202EdH.) Mr. Archer.

Ed.C.I.183su.‡ Internship and Practicum for Teachers of Subnormal Children. A full-time advanced summer school course of teaching, reading, observation, and seminar in the State School at Faribault, with special assignment for graduate students. Board and room in a dormitory at Faribault. (7½ cred.; jr., sr., grad.; prereq. 15 hrs. in ed. and teaching experience.) Dr. Carleton and staff.

Ed.C.I.186su.‡ Laboratory in Elementary Instructional Practices. Actual daily observation of elementary classes in operation, with discussion of techniques, emphasis on activity unit, visual aids, enriched materials, individual differences, diagnoses, socialized situations. Students enrolling in this course must carry at least one other course in the College of Education. (2 cred.; experienced teachers only; observation 4 hrs weekly, MTWThF ar., Tuttle School; lecture TW VI, 106Pt.) Mr. Staudenmaier.

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

Ed.C.I.188su.‡ Laboratory in Elementary Instructional Practices. A full program for six weeks, open to twenty-five Kellogg Foundation students and twenty-five additional applicants. Study and discussion of the problems of child growth and development, and the adjustment of elementary education to meet these problems. Credit may be counted toward an elementary education major. (9 cred.; prereq. permission of the dean of the College of Education, observation daily I-IV; Tuttle School.)

The Development of the Elementary School Child.† (MTWThF VII and 1 hr. ar.) Miss Goodenough.

Adjustments of Elementary Schools to the Development of the Child. (Hrs. ar.) Miss Theman.

Ed.C.I.191su.‡ Advanced Course in the Teaching and Supervision of Secondary School Mathematics. (3 cred.; prereq. Ed. 51C or permission of instructor; MTWThF I; 115UHS.) Mr. Drake.

Ed.C.I.198su. Recent Literature in Methods and Curriculum in English. (3 cred.; sr., grad.; prereq. Ed.T. 66 A, B. C, or equiv.; MTWThF II; 207VH.) Mr. Neville.

Ed.C.I.201su.*‡ Problems in Teaching the Social Studies. (3 cred.; grad. and teachers; prereq. consent of instructor; MTWThF II; 113VH.) Mr. Wesley.

Ed.C.I.254su. Supervision and Teaching of the Social Studies. (3 cred.; grad.; prereq. Ed. 61 A, B, C, or equiv.; MTWThF III; 113VH.) Mr. Wesley.

Ed.C.I.261su.* Special Problems in Supervision of Arithmetic. (Cred. ar.; prereq. consent of instructor; W VI; 114UHS.) Mr. Grossnickle.

Ed.C.I.264su.* Recent Research in Educational Diagnosis. (3 cred.; prereq. Ed.C.I. 151 or equiv.; MTWThF II; 205aUHS.) Mr. Brueckner.

Ed.C.I.266su. Supervision of High School Instruction. (3 cred.; grad.; MTWF IV and 1 hr. ar.; 210Bu.) Mr. Boardman.

Ed.C.I.273su.* Recent Research in Literature and Reading. (Cred. ar.; prereq. permission of instructor; W V; 210Bu.) Mr. Bond.

Ed.C.I.294su.*‡ Advanced Course in Methods of Teaching English. (3 cred.; prereq. Ed.T. 66 A, B, C, or equiv.; MTWThF III; 112VH.) Mr. Neville.

SECOND TERM

Ed.C.I.80su. Safety Education. (2 cred.; first three weeks; MTWTh VI-VII; 210Bu.) Mr. Beadle.

Ed.C.I.105su. Visual Aids in Teaching. (3 cred.; jr., sr., grad.; MTWF IV and 1 hr. ar.; 101WeH.) Miss Clark.

Ed.C.I.107su. Radio in Education. (3 cred.; MTWThF III; 202EdH.) Mr. Tyler.

Ed.C.I.117su. Rural School Management and Instruction. (3 cred.; MTWF IV and 1 hr. ar.; 206WeH.) Mr. Archer.

Ed.C.I.144su. Teaching of Reading in Secondary Schools. (3 cred.; sr.,

* See Notice Concerning Starred Courses, p. 91.

† Elementary education majors not registered in Ed.C.I. 188 may register under Ed.Psy. 148 for three credits in the Development of the Elementary School Child. Credit cannot be received for both Ed.C.I. 188 and Ed.Psy. 148.

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

grad.; prereq. 9 hrs. in ed. including Ed. 51A; MTWThF II; 206Pt.) Mr. Bond.

Ed.C.I.168su. Current Developments in the Social Studies. (3 cred.; MTWThF III; 209EdH.) Mr. Wesley.

Ed.C.I.183su.‡ Internship and Practicum for Teachers of Subnormal Children. (See first term.)

Ed.C.I.254su. Supervision and Teaching of the Social Studies. (3 cred.; grad.; prereq. Ed. 61 A, B, C, or equiv.; MTWThF II; 202EdH.) Mr. Wesley.

Ed.C.I.271Esu.* Problems in Elementary School Curriculum. (3 cred.; grad.; prereq. Ed.C.I. 119 or 172 or equiv.; MTWThF I; 115UHS.) Mr. Bond.

Ed.C.I.271Ssu.* Problems in Secondary School Curriculum. (3 cred.; grad.; prereq. Ed.C.I. 113 or 172 or equiv.; MTWThF I; 204aUHS.) Mr. Bossing.

EDUCATIONAL ADMINISTRATION

FIRST TERM

Ed.Ad.104su. Minnesota School Laws and Regulations. Important school laws and opinions of the attorney-general. The application of recent legislation and State Department of Education regulations to current problems of school organization. This course will be divided into two units of 1½ credits each. Either or both of these units may be taken. (3 cred.; MTWThF VI; 200Pt.) Mr. Caldwell.

Ed.Ad.111su. Rural School Administration and Supervision. Considered primarily from the point of view of those interested in problems of rural education. (2½ cred.; second three weeks; MTWThF III, MTWF IV and 1 hr. ar.; 115VH.) Mr. Archer.

Ed.Ad.114su. The Transportation of Pupils. State regulations, administrative procedures, reports. Mr. Engum will assist in some of the discussions. (3 cred.; MTWThF III; 206Pt.) Mr. Friswold.

Ed.Ad.115su. Organization of the Elementary School. Problems relating to the organization for instruction and classification of pupils in elementary schools with critical examination of current practices. (3 cred.; jr., sr., grad.; prereq. 10 hrs. in ed.; MTWF IV and 1 hr. ar.; 200Pt.) Mr. von Borgersrode.

Ed.Ad.124su. Public School Administration. The organization, administration, and general support of public schools in states and local school districts. Section 1. (3 cred.; sr., grad.; prereq. 10 hrs. in ed.; MTWThF I; 210Bu.) Mr. Neale.

Ed.Ad.125su. Techniques in Administration. Standard practices regarding child-accounting problems, records and reports; procedures having to do with teaching personnel; standard office practices, including textbooks and supply management. (3 cred.; sr., grad.; prereq. Ed.Ad. 124; MTWThF II; 200Pt.) Mr. Sutton.

Ed.Ad.210su.* Financial Aspects of School Business Administration. Financial program planning, budgeting, accounting, cost finding, income and

* See Notice Concerning Starred Courses, p. 91.

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

expenditure control; and the preparation and analysis of financial reports. (3 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWThF I; 200Pt.) Mr. Sutton.

Ed.Ad.218su. Seminar in Secondary School Problems. (No cred.; hrs. ar.; ar.) Mr. Boardman.

Ed.Ad.226su. School Plant Planning and Management. Plant program planning and financing, including operation and maintenance of public school buildings. (3 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWF IV and 1 hr. ar.; 206Pt.) Mr. Friswold.

Ed.Ad.228su.* Special Problems in Educational Administration. For the summer of 1939 this course will deal with recent research in the field of school administration. Superintendents may work on research problems in connection with their own school systems. (3 to 6 cred.; grad.; prereq. Ed.Ad. 124, 125; W II and other hrs. ar.; 114UHS.) Mr. Neale.

Ed.Ad.234su.* Research in Educational Administration. Techniques of research in the field of school administration. (3 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWThF III; 200Pt.) Mr. von Borgersrode.

Ed.Ad.235su. Seminar in Educational Administration. Enrolment limited to candidates for Master's degrees under Plan A and candidates for Ph.D. degrees in educational administration. (No cred.; T VI; 115UHS.) Mr. Neale.

Ed.Ad.265su. High School Administration. (3 cred.; grad.; MTWThF III; 210Bu.) Mr. Boardman.

Ed.Ad.270su.* Special Problems in Secondary Education. (Cred. ar.; prereq. permission of instructor; hrs. ar.; ar.) Mr. Boardman.

See also Industrial Education for Ind. 110su.

SECOND TERM

Ed.Ad.124su. Public School Administration. (3 cred.; sr., grad.; prereq. 10 hrs. in ed.; MTWThF I; 210Bu.) Mr. Farley.

Ed.Ad.125su. Techniques in Administration. (3 cred.; sr., grad.; prereq. Ed.Ad. 124; MTWThF II; 200Pt.) Mr. von Borgersrode.

Ed.Ad.210su.* Financial Aspects of School Business Administration. (3 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWThF III; 200Pt.) Mr. von Borgersrode.

Ed.Ad.226su. School Plant Management. Plant program planning and financing, including operation and maintenance of public school buildings. (3 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWF IV and 1 hr. ar; 210Bu.) Mr. Neale.

Ed.Ad.228su.* Special Problems in Educational Administration. For the second term this course will deal with methods of research in the field of school administration. (3 to 6 cred.; grad.; prereq. Ed.Ad. 124, 125; MTWThF III; 210Bu.) Mr. Neale.

Ed.Ad.230su.* Public Relations for Schools. Theory and practice of educational interpretation. Principles involved; machinery and personnel; the teacher's contacts with the community; the role of the pupil; professional

* See Notice Concerning Starred Courses, p. 91.

and lay organization; techniques and mediums of educational interpretation. Layout; news and feature writing; radio broadcasting; bulletins and reports; exhibits; special occasions. (3 cred.; prereq. Ed.Ad. 124, 125; MTWThF II; 210Bu.) Mr. Farley.

Ed.Ad.264su. High School Administration. (3 cred.; grad.; MTWF IV and 1 hr. ar.; 200Pt.) Mr. Bossing.

EDUCATIONAL PSYCHOLOGY

FIRST TERM

Ed.Psy.113su. Psychology of Elementary School Subjects. This course will include a consideration and interpretation of the results of the 1935-38 measurement program of the State Testing Committee in Minnesota. (3 cred.; jr., sr., grad.; prereq. 10 cred. in psy. and ed.; MTWThF I; 209EdH.) Mr. Van Wagenen.

Ed.Psy.120su. Basic Principles of Measurement. (3 cred.; sr., grad.; prereq. Ed. 51A or equiv.; MTWThF III; 209EdH.) Mr. Cook.

Ed.Psy.140Esu. Tests and Measurements for Elementary Schools. (3 cred.; sr., grad.; prereq. Ed.Psy. 120 or consent of instructor; MTWF IV and 1 hr. ar.; 106Pt.) Mr. Van Wagenen.

Ed.Psy.140Ssu. Tests and Measurements for Secondary Schools. (3 cred.; sr., grad.; prereq. Ed.Psy. 120 or consent of instructor; MTWF IV and 1 hr. ar.; 204aUHS.) Mr. Cook.

Ed.Psy.148su. The Development of the Elementary School Child. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.; students receiving credit in C.W. 132 or in Ed.C.I. 188 may not register for this course; MTWThF VII and 1 hr. ar.; Tuttle School.) Miss Goodenough.

Ed.Psy.158su. Psychology of Adolescence. (3 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.; MTWThF VI; 201WeH.) Mr. Brown.

Ed.Psy.159su. Personality Adjustments in Education. (3 cred.; sr., grad.; prereq. Ed. 51A and Ed.Psy. 116 or equiv.; MTWF IV and 1 hr. ar.; 201WeH) Mr. Brown.

Ed.Psy.180su. Esthetics in Education. (3 cred.; sr., grad.; consent of instructor; MTWThF III; 207aJ.) Mr. Faulkner.

Ed.Psy.216su. Statistical Methods in Education. (3 cred.; grad.; MTWThF II; 202EdH.) Miss Wilder.

Ed.Psy.225su.* Diagnosis and Counseling in Guidance. (3 cred.; grad.; prereq. Ed. 133 and Ed.Psy. 120 or equiv.; MTWThF III; 206WeH.) Mr. Wrenn.

Ed.Psy.253su.* Research Problems. (Cred. ar.; grad.; prereq. consult instructor; ar.; ar.) Mr. McConnell, Mr. Wrenn, Mr. Cook, Mr. Van Wagenen.

Ed.Psy.281su. Guidance Clinic. (3 cred.; grad.; limited enrolment, admission with permission of instructor only; ar.; 101EdH.) Mr. Darley.

Ed.Psy.293su.* Psychology of Learning. (3 cred.; grad.; prereq. 12 cred. in psy. and ed. psy.; MTWThF II; 210Bu.) Mr. McConnell.

* See Notice Concerning Starred Courses, p. 91.

The following courses in the Psychology Department may be substituted for courses in educational psychology:

Psy.106su. Psychology of Vocational Interests and Aptitudes. Graduate advisers may recommend this course for programs in educational psychology. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF II; 1VH.) Mr. Strong.

Psy.109su. Psychology of Individual Differences. Credit in this course may be substituted for Ed.Psy. 291. (3 cred.; jr.. sr., grad.; prereq. general psychology; MTWThF III; 1VH.) Mr. Strong.

SECOND TERM

Ed.Psy.60su. Introduction to Statistical Methods. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWF IV and 1 hr. ar.; 100Pt.) Mr. Drake.

Ed.Psy.115su. Psychology of Elementary School Subjects. (3 cred.; jr., sr., grad.; prereq. 10 cred. in psy. and ed.; MTWThF III; 106Pt.) Mr. Van Wagenen.

Ed.Psy.120su. Basic Principles of Measurement. (3 cred.; sr., grad.; prereq. Ed. 51A or equiv.; MTWThF II; 209EdH.) Mr. Cook.

Ed.Psy.141su. Construction and Use of Group Aptitude Tests. (3 cred.; sr., grad.; prereq. Ed.Psy. 120 or equiv.; MTWF IV and 1 hr. ar.; 202EdH.) Mr. Cook.

Ed.Psy.158su. Psychology of Adolescence. (3 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.; MTWThF III; 206WeH.) Mr. Archer.

Ed.Psy.159su. Personality Adjustments in Education. (3 cred.; sr., grad.; prereq. Ed. 51A and Ed.Psy. 116 or equiv.; MTWF IV and 1 hr. ar.; 209EdH.) Mr. McConnell.

Ed.Psy.183su. Psychology of Gifted Children. (3 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.; MTWThF II; 106Pt.) Mr. Van Wagenen.

Ed.Psy.253su.* Research Problems. (Cred. ar.; prereq. consult instructor; ar.; ar.) Mr. McConnell, Mr. Cook, Mr. Van Wagenen.

Ed.Psy.294su.* The Improvement of Learning. (3 cred.; grad.; prereq. 12 cred. in psy. and ed. psy.; MTWThF I; 209EdH.) Mr. McConnell.

The following course in the Psychology Department may be substituted for Ed.Psy. 291:

Psy.109su. Psychology of Individual Differences. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF I; 115Psy.) Mr. Carlson.

HOME ECONOMICS EDUCATION

FIRST TERM

H.E.Ed.192su. Educational Measurement in Home Economics. (Page 84.†) (2 cred.; prereq. H.E.Ed. 91 and 93; MWF I, II; 112HE.) Miss Rose.

* See Notice Concerning Starred Courses, p. 91.

† Page numbers in course descriptions refer to the College of Agriculture, Forestry, and Home Economics Bulletin for 1938-40 where further information may be found.

H.E.Ed.193su. Home Economics Curricula.§ A study of general problems of curriculum reorganization with their implications for home economics at the various levels and in different type situations. Special attention will be given to the newer uses of home economics, including an integrated program, work for boys, nonlaboratory classes. Class time will be used for general discussion, small group and individual work on special problems. (3 cred.; jr., sr., grad.; MT VI, WTh VI, VII; 304HE.) Miss Spafford.

H.E.Ed.194asu. Adult Education Problems. Development of unit outlines in various fields of home economics. Discussion of teaching methods. This course is planned for high school and extension teachers and supervisors of home economics classes. (3 cred.; prereq. H.E.Ed. 91 or equiv.; MTWThF I; 106HE.) Miss Krost.

H.E.Ed.194bsu. Adult Education Problems. Development of materials including bibliography for use in adult classes. This course is planned for teachers and supervisors of local leader groups or adult classes. (3 cred.; prereq. H.E.Ed. 91 or equiv.; MTWThF V and 1 hr. ar.; 106HE.) Miss Krost.

H.E.Ed.243su. Trends in Home Economics Education. A study of present social situations and trends—sociological, political, and economic—and their effect on various social institutions—especially the family—with emphasis on the challenge to education and to home economics. Readings will extend into many types of materials. Small groups may select single aspects for intensive study, reporting their findings to the entire class. The entire group, however, will discuss the implications of the more significant problems for education and home economics, interpreting these in terms of their individual situations. (3 cred.; permission of instructor; MT IV, WTh IV, V; 304HE.) Miss Spafford.

H.E.Ed.294su.* Investigations and Research in Home Economics Education. Emphasis placed on the locating and analyzing of the important problems in the field of home and family life education which present a challenge to the home economics teacher at various educational levels. Each student will be required to collect and organize materials and present a tentative solution of her chosen problem. (3 cred.; permission of instructor; TTh I, II and 2 hrs. ar.; 112HE.) Miss Rose.

INDUSTRIAL EDUCATION

FIRST TERM

Ind.11su.‡ Special-Class Woodwork. Limited to 24; women only; for teachers of art, subnormal, and primary work; not open to those with college credit in woodworking. (3 cred.; no prereq.; MTWThF VII-VIII; 6Pt.) Mr. Micheels.

* See Notice Concerning Starred Courses, p. 91.

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

§ Students expecting to register in this class should bring curriculum materials with them, such as courses of study, unit outlines, books on curriculum.

Ind.40su. Analysis. (3 cred.; no prereq.; MTWThF I; 202UHS.) Mr. Schweickhard.

Ind.61su. Practices in Vocational Education. (3 cred.; prereq. Ind. 60; MTWThF III; 114UHS.) Mr. Widdowson.

Ind.66su. Related Subjects. (3 cred.; prereq. Ind. 40, 42; MTWF IV and 1 hr. ar.; 114UHS.) Mr. Craigo.

Ind.103su. Instructional Aids. (3 cred.; sr., grad.; prereq. Ind. 40, 42; MTWThF I; 202EdH.) Mr. Widdowson.

Ind.110su. Guidance in the Schools. (3 cred.; jr., sr., grad.; prereq. Ed. 51A; MTWThF II; 204bUHS.) Mr. Smith (See also Ed. 133.)

Ind.200su.* Research Problems. (Plan B. Papers.) (3 to 9 cred.; grad. only, with approval as candidate for Master's degree; MTWF IV; 202EdH.) Mr. Smith.

SECOND TERM

Ind.44su. Equipment and Management. (3 cred.; prereq. Ind. 40, 42; MTWThF II; 114UHS.) Mr. Widdowson.

Ind.172su. Part-time Education. (3 cred.; jr., sr., grad.; prereq. Ind. 170, 171; MTWThF I; 114UHS.) Mr. Widdowson.

Shop and Drawing Courses

All degree candidates should keep in mind the maximum of 45 quarter credits in shopwork and drawing combined. Twenty quarter credits of shopwork and 10 quarter credits of drawing are required. Fifteen elective credits may be used in either or both of these fields. See also the requirement of six credits in art education.

Shop and drawing credits in wide variety are listed elsewhere in this bulletin. See Architecture and Fine Arts, Drawing and Descriptive Geometry, Mechanical Engineering, and Agricultural Engineering.

Notes

A description of the department, showing the four-year curriculum, will be mailed upon request. Acquaintance with this curriculum and consultation with the adviser will aid students in selecting required and elective courses from other sections of this Summer Session Bulletin.

Correspondence is invited upon such matters as the transfer of undergraduate credit, graduate status and program, thesis work if elected, certification for federally aided positions (Smith-Hughes and George-Deen), etc. Address inquiries to Professor Homer J. Smith, 200 Eddy Hall. The usual bulletin requests should go to the registrar in the Administration Building. Those planning to enroll at Minnesota for the first time cannot be urged too strongly to begin the preliminary steps at once.

METHODS AND DIRECTED TEACHING

FIRST TERM

Ed.T.52su.†‡ Practice Teaching. (3 to 5 cred.; prereq. consent of instructor; ar.) Mr. Carlson.

Ed.T.55su. Principles of Early Childhood Education. (3 cred.; jr., sr.; prereq. C.W. 80; MTWThF I and 1 hr. ar.; 100Pt.) Miss Peterson.

* See Notice Concerning Starred Courses, p. 91.

† Passing the qualifying examination is prerequisite to registration in this course.

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

Ed.T.56su. Permanent Play Materials. (2 cred.; jr., sr.; prereq. Ed.T. 55; TWThF VI; 100Pt.) Mrs. Parkinson.

Ed.T.59su. Story Telling for Young Children. (2 cred.; jr., sr.; prereq. Ed.T. 55; MTWTh VII; 202Pt.) Miss Headley.

Ed.T.66Amsu.†‡ The Teaching of Composition in the Senior High School. (2 cred.; sr.; TWThF VI; 111UHS.) Mr. Kehl.

Ed.T.66Bmsu.†‡ The Teaching of Literature in the Senior High School. (2 cred.; sr.; TWThF V; 111UHS.) Miss Handlan.

Ed.T.68Am,Bmsu.†‡ Methods of Teaching Secondary School Science. (4 cred.; sr.; prereq. consent of instructor; TWThF V-VI; 215UHS.) Mr. Peterson.

Ed.T.69Am,Bmsu.†‡ Methods of Teaching History and Social Studies. (4 cred.; jr., sr.; prereq. consent of instructor; MTWF IV-V; 112UHS.) Mr. Morse.

Ed.T.73A,Bsu.†‡ Special Methods in the Commercial Subjects. (4 cred.; jr., sr.; prereq. consent of instructor; TWThF VI-VII; 206UHS.) Miss Mo.

Ed.T.76Asu.†‡ Methods and Observation in the Nursery School and Kindergarten. (1 cred.; jr., sr.; prereq. Psy. 1-2, Ed.T. 55 or simultaneously; F VII and observation hrs. ar.; 202Pt.) Miss Headley, Miss Peterson.

Ed.T.76Bsu.†‡ Methods and Observation. Home-school relations. 1 cred.; jr., sr.; prereq. Ed.T. 55 or simultaneously; F VI and observation hrs. ar.; 202Pt.) Mrs. Cummings.

MUSIC EDUCATION

FIRST TERM

Mu.Ed.50Asu.‡ Primary Methods. (2 cred.; no prereq.; MTWThF III; 4Mu.) Mrs. Nohavec.

Mu.Ed.52su.‡ Technique of Teaching Appreciation. (1 cred.; prereq. Mu.Ed. 50; Th V; 4Mu.) Mrs. Nohavec.

Mu.Ed.54su.‡ Operetta Production. (3 cred.; prereq. Ed. 51A; MTWF IV, F V; 4Mu.) Mrs. Nohavec.

Mu.Ed.65su.‡ Instrumentation. (4 cred.; prereq. Mu.Ed. 4-5-6; MTWThF II; 5NMA.) Mr. Boessenroth.

Mu.Ed.68su. Conducting of Instrumental Music and Survey of Materials. (4 cred.; sr.; prereq. Mu.Ed. 65; MTWF I-II; 4Mu.) Mr. Pepinsky.

Mu.Ed.70su. Accompanying and Sight Reading. (2 cred.; jr., sr.; MWF III; 104Mu.) Mr. Scott.

SECOND TERM

Mu.Ed.4su.‡ Applied Instrumental Technique (Strings). (2 cred.; no prereq.; MTWThF I; 4Mu.) Mr. Pepinsky.

Mu.Ed.65su.‡ Instrumentation. (3 cred.; prereq. Mu.Ed. 4-5-6; MTWThF II; 4Mu.) Mr. Pepinsky.

† Passing the qualifying examination is prerequisite to registration in this course.
‡ A fee of $1 per credit is charged for this course.

PHYSICAL EDUCATION AND ATHLETICS

PHYSICAL EDUCATION FOR MEN

Credit for courses taken in the Summer Session will be given toward a regular teacher's certificate in physical education where the courses are included in the physical education major.

The gymnasium, tennis courts, baseball diamonds, running track, and handball and squash courts will be available to students in the Summer Session. The swimming pools in Cooke Hall and University Farm gymnasium will be open for recreational swimming from 2:30 to 5:30 p.m. each day except Saturdays.

FIRST TERM

1su. Beginning Swimming. Instruction for men who are unable to swim. Altho the correct form is stressed from the very beginning and no attempt is made to hurry the learner, most men will be able to swim the length of the pool in three or four weeks. Different strokes will be taught as the ability of individuals warrants. (1 cred.; MTWThF VIII; Recreation Pool, CH.) Mr. Piper, Mr. Ostrander.

5Asu.* Physical Education Activities. Calisthenics, conditioning drills, mimetics, corrective exercises, exhibition drills, story plays, and marching tactics. (1 cred.; MTWThF VII; Gym., CH.) Mr. Piper, Mr. Bartelma.

5Bsu.* Physical Education Activities. Rhythms: fundamental dance steps, folk dances, square dances, and social dances. (1 cred.; MTWThF VII; Gym., CH.) Mr. Piper.

5Csu.* Physical Education Activities. Stunts and play gymnastics. Individual and combination stunts with and without equipment, tumbling stunts, apparatus stunts. (1 cred.; MTWThF VII; Gym., CH.) Mr. Ostrander.

6Asu.* Intramural Sports. Soccer, speedball, touchball, softball, volleyball. (1 cred.; MTWThF III; Gym., CH.) Mr. Beise.

6Bsu.* Intramural Sports. Handball, squash rackets, boxing, wrestling, golf. (1 cred.; MTWThF III; Gym., CH.) Mr. Bartelma.

6Csu.* Intermediate Swimming. For those who can swim at least fifty yards. Instruction in the form of various strokes, diving, lifesaving, water games and stunts. Designed to aid those men who may be called upon to teach swimming in schools, playgrounds, or camps, as well as for men who wish to improve their own performance. (1 cred.; MTWThF VIII; Recreation Pool, CH.) Mr. Piper.

7Asu.* Recreational Games and Sports. Playground and gymnasium games, social games, progressive game parties, mixers, noon-hour activities. (1 cred.; MTWThF VI; Gym., CH.) Mr. Ostrander.

7Bsu.* Recreational Games and Sports. Badminton, aerial darts, archery,

* All activity courses will be professionalized in respect to emphasis on teaching methods as well as actual performance. Men are requested to see Mr. Piper for advice before registering for activity courses.

horseshoes, table tennis, tennis, deck tennis, paddle tennis. (1 cred. MTWThF VI; Gym., CH.) Mr. Piper.

48su. Organization of Boy Scout and Camp Activities. Especially designed to assist men leading groups in leisure time activities and to train others to qualify as scout masters and camp leaders. (2 cred.; MTWThF II; 214CH.) Mr. Osell.

50su. Human Anatomy. A study of the structure of the human body with emphasis upon bones, nerves, and muscles and their significance in physical education. (3 cred.; MTWThF III; 206CH.) Dr. Hauser, Mr. Osell.

51su. (Formerly Course 36.) Mechanics of Movement. A discussion of the principles and mechanics of bodily movements; the effect of various exercises upon the tissues and organs of the body. (2 cred.; MTWF IV; 206CH.) Mr. Osell.

53,54su.‡ Methods and Materials in Physical Education. Application of principles of methodology to physical education, analysis and study of the techniques of measurement devices for grading and classifying pupils. (2 cred.; MTWF IV; 215CH.) Mr. Bartelma.

56su. Nature and Function of Play. A study of the philosophy of play and a survey of types of play, their values, and classification of activities according to age and sex differences. (2 cred.; MTWThF III; 214CH.) Mr. Haislet.

60su. Prevention and Care of Injuries. Principles governing conditioning of men for various sports; diet, sleep, exercise, bathing, massage. Overtraining; its cause, diagnosis, prevention, and cure. Prevention and treatment of common athletic injuries. (2 cred.; MTWThF II; 206CH.) Mr. Stein.

63su. Organization and Administration of Physical Education and Athletics. Problems of organization, administration, and supervision. Arrangement of program; schedule making; construction; equipment, and care of gymnasia and athletic fields. (3 cred.; MTWThF V; 206CH.) Mr. Piper.

66A,B. Methods and Techniques of Officiating. Qualifications of officials; officiating ethics; discussions of rules and officiating in touchball, football, basketball, wrestling, boxing, volleyball, gymnastics, swimming, track, softball, and baseball. (66A will include touchball, football, and basketball, 1 cred.) (2 cred.; MTWThF I; 214CH.) Mr. Smith.

67su. Coaching of Athletic Sports (Football). Study of the theory, strategy, generalship, styles of attack and defense, methods of organization, practice sessions and handling men. (2 cred.; MTWF IV; 214CH.) Dr. Hauser, Mr. Beise.

101Esu.† Principles of Physical Education. A study of the aims, scope, and biological aspects of physical education with special treatment of its place in education. (3 cred.; MTWThF I; 215CH.) Mr. Keller.

* All activity courses will be professionalized in respect to emphasis on teaching methods as well as actual performance. Men are requested to see Mr. Piper for advice before registering for activity courses.

† Courses marked "E" carry credit toward the degree of master of education.

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

133Esu.† Special Administrative Problems in Physical Education. Survey of staff organizations in typical situations such as small towns, cities, states, schools, and colleges; construction, maintenance, and policies for use of facilities; purchase, care, and use of equipment; legal aspects of physical education and athletic activities. (3 cred.; sr., grad.; prereq. 63 or equiv.; MTWThF V; 215CH.) Mr. Nordly.

134Esu.† The Curriculum in Physical Education. Theory and principles of program construction applied to physical education. Critical analysis of existing programs and evaluation of activities in the light of modern trends. Practical application of principles in the construction of a program for a specific situation. (3 cred.; sr., grad.; prereq. 63 or equiv.; MTWF IV; 205CH.) Mr. Nordly.

135Esu.† Tests and Measurements in Physical Education. Critical analysis of existing research studies in physical education with special emphasis upon tests and measurements. Study of current tests from both practical and theoretical standpoints. The use of tests in the administration of physical activity programs. Application of the principles of test construction to specific problems in physical education. (3 cred.; sr., grad.; prereq. 60 or equiv.; MTWThF II; 215CH.) Mr. Keller.

136Esu.† Leadership in Recreation. A study of problems of leadership in community recreation; finance, co-ordination of existing agencies promoting recreation activities, facilities, and public relations. (3 cred.; MTWThF I; 206CH.) Mr. Haislet.

SECOND TERM

1su. Beginning Swimming. Instruction for men who are unable to swim. Altho the correct form is stressed from the very beginning and no attempt is made to hurry the learner, most men will be able to swim the length of the pool in three or four weeks. Different strokes will be taught as the ability of individuals warrants. (1 cred.; MTWThF VII; Recreation Pool, CH.) Mr. Piper, Mr. Ostrander.

5Bsu.* Physical Education Activities. Rhythms: fundamental dance steps, folk dances, square dances, and social dances. (1 cred.; MTWThF IV; Gym., CH.) Mr. Piper.

5Csu.* Physical Education Activities. Stunts and play gymnastics. Individual and combination stunts with and without equipment, tumbling stunts, apparatus stunts. (1 cred.; MTWThF IV; Gym., CH.) Mr. Ostrander.

6Csu.* Intermediate Swimming. For those who can swim at least fifty yards. Instruction in the form of various strokes, diving, lifesaving, water games and stunts. Designed to aid those men who may be called upon to teach swimming in schools, playgrounds, or camps, as well as for men who wish to improve their own performance. (1 cred.; MTWThF VIII; Recreation Pool, CH.) Mr. Piper.

* All activity courses will be professionalized in respect to emphasis on teaching methods as well as actual performance. Men are requested to see Mr. Piper for advice before registering for activity courses.

† Courses marked "E" carry credit toward the degree of master of education.

7Asu.* Recreational Games and Sports. Playground and gymnasium games, social games, progressive game parties, mixers, noon-hour activities. (1 cred.; MTWThF VI; Gym., CH.) Mr. Ostrander.

7Bsu.* Recreational Games and Sports. Badminton, aerial darts, archery, horseshoes, table tennis, tennis, deck tennis, paddle tennis. (1 cred.; MTWThF VI; Gym, CH.) Mr. Piper.

53,54su. Methods and Materials in Physical Education. Application of principles of methodology to physical education, analysis and study of the techniques of measurement devices for grading and classifying pupils. (2 cred.; MTWF III; 215CH.) Mr. Bartelma.

101Esu.† Principles of Physical Education. A study of the aims, scope, and biological aspects of physical education with special treatment of its place in education. (3 cred.; MTWF IV, Th V; 215CH.) Mr. Keller.

133Esu.† Special Administrative Problems in Physical Education. Survey of staff organizations in typical situations such as small towns, cities, states, schools, and colleges; construction, maintenance, and policies for use of facilities; purchase, care, and use of equipment; legal aspects of physical education and athletic activities. (3 cred.; sr., grad.; prereq. 63 or equiv.; MTWThF I; 215CH.) Mr. Nordly.

135Esu.† Tests and Measurements in Physical Education. Critical analysis of existing research studies in physical education with special emphasis upon tests and measurements. Study of current tests from both practical and theoretical standpoints. The use of tests in the administration of physical activity programs. Application of the principles of test construction to specific problems in physical education. (3 cred.; sr., grad.; prereq. 60 or equiv.; MTWThF III; 215CH.) Mr. Keller.

136Esu.† Leadership in Recreation. A study of problems of leadership in community recreation; finance, co-ordination of existing agencies promoting recreation activities, facilities, and public relations. (3 cred.; MTWF IV, Th V; 206CH.) Mr. Haislet.

137Esu.† Recent Literature and Research in Physical Education. Directed readings and class discussions of recent literature; critical analysis of research in physical education; selection and presentation of an outline for the solution of a problem. (3 cred.; grad.; prereq. permission of instructor; MTWThF II; 215CH.) Mr. Nordly.

PHYSICAL EDUCATION FOR WOMEN

FACILITIES FOR RECREATION

The swimming pool is open for recreational use from 12:00 m. to 12:45 p.m. Monday through Friday and from 2:00 to 4:00 p.m. Monday through Thursday during the first term; and from 12:00 m. to 12:45 p.m. Monday through Friday during the second term.

The university tennis courts and the university golf course are open to students.

* All activity courses will be professionalized in respect to emphasis on teaching methods as well as actual performance. Men are requested to see Mr. Piper for advice before registering for activity courses.

† Courses marked "E" carry credit toward the degree of master of education.

A daily sports hour from 12:00 m. to 1:00 p.m. is arranged in the sports room of the Women's Gymnasium for the enjoyment of women students; activities such as aerial darts, badminton, and table tennis will be available.

FEES

Tickets for the rental of suits and towels for swimming are 10 cents apiece. The charges for tennis are $1 for each term and for golf 50 cents for 18 holes (45 cents if one buys a coupon book of ten tickets). Towels for shower bath may be procured from the matron for 5 cents apiece.

The maximum course fee for students taking two or more courses in physical education is $3.50 per term.

COURSE OFFERING

The course offering presents representative opportunities toward fulfillment of all the important lines of development offered regularly by the department: recreational activity, elementary skills courses; the nine-credit state endorsement plan; the undergraduate minor and major; and graduate work. Courses applying to the new state minor in physical education are: Phys.Ed. 4, 5, 10, 13, 16, 18, 37, 51, and 52.

FIRST TERM

3su.‡ Recreational Leadership. (3 cred.) (Not offered in 1939.)

4su. Fundamentals of All Rhythmic Work. The fundamental elements of rhythm are applied to all types of rhythmic activity usable in the grade and junior high school; special applications are made to rhythms for little children, folk and clog dancing, and social dancing. Includes some reference to methods of approach. Not a skills course primarily. (1 cred.; no prereq.; MTWTh II and 1 hr. ar.; 151WGm.) Miss Braun.

5su.†‡ Methods of Coaching and Conducting Organized Games for the Junior and Senior High School. Special techniques for team games such as field ball, speed ball, soccer, hockey, volleyball, basketball, and baseball. Organization of extra-curricular activities, e.g., athletic associations, after-school programs, tournaments suited to various games, play days, methods of teaching, practice teaching within the group. Practical work MTWThF II may be taken for one credit. (2 cred.; prereq. permission of dept.; MTWThF II and TTh VI; 153,201WGm.) Miss Snell.

7su. Tennis for Beginners. (½ cred.; no prereq.; TTh 7:00 a.m. and 1 hr. ar.; 60WGm.)

8su. Golf for Beginners. Limited to 20. (½ cred.; no prereq.; MW 7:00 a.m. and 1 hr. ar.; 60WGm.) A period for elective practice will be arranged for members of the classes. Miss Thomas.

9su. Elementary-Intermediate Golf. (½ cred.) (Not offered in 1939.)

10su.‡ Teacher's Course in Fundamentals of Physical Education. The fundamentals of skill in balance, timing, force, and direction are applied to games and self-testing activities. Study of the use of underlying prin-

† This course carries credit toward the major or minor in physical education.
‡ A fee of $1.75 is charged for this course.

ciples in teaching activities. Emphasis will be placed upon motor experiences to develop a perspective on activity in general as well as the resulting outcomes, e.g., posture. (1 cred.; no prereq.; MTWTh I; 60WGm.) Miss Braun.

11su.‡ Modern Dance. (1 cred.) (Not offered in 1939.)

12su. Social Dancing and Mixers. The course includes training in social dance skills, the technique of teaching social dancing, and representative "ice breaker" procedure. (1 cred.; no prereq.; MTWTh III and 1 hr. ar.; 153WGm.) Miss Braun.

13su.‡ Tumbling, Stunts, and Pyramids for Junior and Senior High Schools. Instruction and practice in technique of individual, companion, and group tumbling and stunts with progression from elementary to more advanced. Discussion and application of principles underlying pyramid building. Self-testing activities and track and field events for girls of junior and senior high school age. (1 cred.; no prereq.; MTWTh I and 1 hr. ar.; 153WGm.) Miss Thomas.

16su.‡ Elementary Tap Dancing. Primarily an intensive skill experience in routines, dances, and basic steps in clog and tap dancing. (1 cred.; no prereq.; MTWTh 7:00 a.m. and 1 hr. ar.; 151WGm.) Miss Braun.

17su.‡ Intermediate Tap Dancing. (1 cred.) (Not offered in 1939.)

18su.‡ Elementary Folk Dancing and Games. This course presents material primarily for those teaching in the elementary and secondary school. Consideration is given to the methods of organizing and teaching the activities. (1 cred.; no prereq.; MTWTh IV and 1 hr. ar.; 151WGm.)

32su.‡ Elementary Swimming. Class instruction given. Sections limited to 25. (1 cred.; prereq. phys. exam.; Sec. 1 MTWF IV and 1 hr. ar.; Sec. 2 MTWTh VI and 1 hr. ar.; 51WGm.) Miss Thomas.

33su.‡ Intermediate and Advanced Swimming. (1 cred.) (Not offered in 1939.)

34su.‡ Lifesaving and Diving. (1 cred.) (Not offered in 1939.)

37su.‡ Individual and Dual Games. This course deals with the various methods and techniques suitable for the teaching of the following sports: golf, tennis, archery, badminton, deck tennis, tether ball, shuffleboard. Consideration of group methods adaptable to the organization and teaching of these activities on the junior and senior high school level. The course consists of lectures and laboratory work. There is opportunity for practice teaching within group and for individual skill development. (1 cred.; no prereq.; MTWTh III and 1 hr. ar.; 60WGm.)

38su. Introduction to Physical Education for Teachers and Administrators. (3 cred.) (Not offered in 1939.)

51su. Health and Safety Education. Study of principles, materials, and problems of health and safety education in preparation for teaching. Observation and practice in tests and observation of techniques of health work. (2 cred.; prereq. permission of instructor; MTWF IV; 201WGm.) Miss Starr.

‡ A fee of $1.75 is charged for this course.

52su. Principles and Curriculum of Physical Education. In this course principles of philosophy, curriculum, method, and evaluation are studied in the light of their psychological, biological, and social significance. (2 cred.; prereq. permission of instructor; MTWTh III; 201WGm.) Miss Baker.

53su. Organization and Administration of Physical Education. Study of the care and use of facilities and equipment; organization of the physical education program from the standpoint of classification of the students, appraisal of activities, management of class. Relationship of physical education program to community. (2 cred.; prereq. permission of instructor; MTWTh III; 3WGm.) Miss Snell.

113Esu.† Physical Education in the Elementary Schools. Growth and development of the child in relation to existent and potential practices and emphases in program construction of physical education activities; likewise standards for classification and methods of teaching children; functions and interrelationships of personnel which are most efficacious in the direction of a program of physical education in the elementary school. (3 cred.; prereq. permission of instructor; MTWF IV and Th V; 3WGm.) Miss Baker.

114Esu.† The Administration of the Health Education Program. Study of various health organizations in city and state; integration of health teaching within the school. Opportunities for guidance and supervision of health teachers by physical educator. Administration of a safety program. (3 cred.; prereq. permission of instructor; MTWThF II; 3WGm.) Miss Starr.

SECOND TERM

18su.‡ Elementary Folk Dancing and Games. This course presents material primarily for those teaching in the elementary and secondary school. Consideration is given to the methods of organizing and teaching the activities. (1 cred.; no prereq.; MTWTh III and 1 hr. ar.; 151WGm.) Miss Graybeal.

20su. Archery for Beginners. (½ cred.; no prereq.; MW IV; 60WGm.) Miss Graybeal.

111Esu.† An Advanced Course in Methods of Teaching in Physical Education. The purpose of this course is to give an overview of the activity program in reference to instructional content and procedures. A comparison of specific fields of activity should reveal existent strengths and weaknesses according to the best scientific findings and empirical standards. Outstanding results of the course should be increased perspective of the common problems in the various activities as well as those peculiar to each activity, possible solutions for conspicuous instructional needs, and a more integrated view of the entire field. (3 cred.; prereq. permission of instructor; MTWThF II; 201WGm.) Miss Graybeal.

† Courses marked "E" carry credit toward the degree of master of education.
‡ A fee of $1.75 is charged for this course.

SCHOOL OF BUSINESS ADMINISTRATION

GENERAL INFORMATION

ADMISSION

For admission to the School of Business Administration a student must have satisfied the requirements of one of the two-year prebusiness courses, either in the College of Science, Literature, and the Arts, the College of Agriculture, Forestry, and Home Economics, or the Institute of Technology. A student must have a minimum of 90 credits, with one honor point per credit or a smaller number of credits determined as follows: For every five honor points in excess of one per credit, the number 90 is diminished by one.

SPECIAL STUDENTS

A limited number of high school graduates who have reached the age of twenty-four and can furnish evidence to the effect that they have had successful business experience in an executive capacity may be admitted as special students. If later they decide to become candidates for a degree they must complete the requirements of the prebusiness course.

STUDENTS IN OTHER SCHOOLS OR COLLEGES OF THE UNIVERSITY

Regularly enrolled students in other schools or colleges of the University may be admitted to such courses in the School of Business Administration as are authorized by the faculties of the School of Business Administration and the school or college concerned. Such students are urged to select their business subjects in accordance with a definite plan, and as far as possible to complete a systematic course of business study.

NOTE.—Special provision has been made this summer for the direction of graduate students working on theses. For further information inquire at the dean's office of the School of Business Administration.

FIRST TERM

Econ.3su. Elements of Money and Banking. The basic principles of money and a description of the various types of financial institutions, their functions and relations to the whole economic organization. (3 cred.; 2nd and 3rd qtr. fr., soph., jr., sr.; no prereq.; MTWThF V; 2VH.) Mr. Graves.

Econ.5su. Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; MTWThF III; 2VH.) Mr. Graves.

Econ.6su. Principles of Economics. A course in the fundamental principles of economics intended to serve as a foundation for advanced courses in business administration and economics. (3 cred.; soph., jr., sr.; no prereq.; MTWF IV and 1 hr. ar.; 6VH.) Mr. Stigler.

Econ.20su. Elements of Accounting. The 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. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; MTWThF II; 6VH.) Mr. Boddy.

Econ.25su.† Principles of Accounting. The corporate balance sheet and income statement, capital stock, stock subscriptions, premium and discount on stock, surplus, reserves, dividends, bond valuation, and amortization. (3 cred.; soph., jr., sr.; prereq. Econ. 20; MTWThF I; 6VH.) Mr. Heilman.

B.A.89su. Production Management. Location and layout of industrial plants; types of operating organization; shop personnel; standards of operation; purchasing and inventory control; routing, scheduling and dispatching of product; scientific management; practical problems in production control. (3 cred.; jr., sr.; no prereq.; MTWThF III; 6VH.) Mr. Filipetti.

B.A.101su. Advanced General Economics. (For the Summer Session this course in the equivalent of Econ. 103.) A detailed analysis of price determination under competitive and monopolistic conditions, with special emphasis on rigorous training in the techniques of modern economic analysis. The major topics are laws of return, demand curves, cost curves, and short and long run prices under various types of competition. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; Sec. 1, MTWThF I, 2VH.) Mr. Boddy. (Sec. 2, MTWThF II, 105VH.) Mr. Stigler.

B.A.139su.‡ 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. Accounting methods and statements in a number of business fields. (3 cred.; jr., sr., grad.; prereq. Econ. 25-26; MTWThF II; 2VH.) Mr. Heilman.

B.A.142su. Advanced Money and Banking. (For the Summer Session this course is the equivalent of Econ. 141.) 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. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either 6-7 or 83; MTWF IV and 1 hr. ar.; 105VH.) Mr. Marget.

Econ.149su. 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. Econ. 141 or B.A. 142 or consent of instructor; MTWThF V; 105VH.) Mr. Marget.

Econ.169su. Recent Economic Legislation. A discussion of some of the more important national and state legislation affecting economic life considered as national policies; e.g., balancing the incomes of economic groups, agricultural adjustment, control of competition, control of the

† 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.

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

price level, social security. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWF IV and 1 hr. ar.; 113VH.) Mr. Garver.

Econ.176su. International Commercial Policies. Theory of international commerce; protective tariffs, free trade, reciprocity, subsidies, preferential treatment, the open door, international finance, commercial treaties, foreign politics, and other governmental and organized efforts to affect trade. American problems emphasized. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWThF III; 207VH.) Mr. Blakey.

B.A.188su. Industrial Organization. The internal organization of industry for operation; the problems of organization; the possible structural alternatives to realize these purposes; and the tests of good organization. The general social organization of industry is considered and its relationship to internal management structure is analyzed. The material presents several aspects of one of the major problems of contemporary industrial management. To an increasing extent consideration is being given to these principles and techniques as they apply to governmental organization. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7; MTWThF V; 6VH.) Mr. Filipetti.

Econ.189su. Principles of Taxation. (For the Summer Session this course may be substituted for B.A.58.) Development of taxation; property, income, commodity, sales, inheritance and other taxes; shifting, incidence and other effects; federal, state, and local relations; special problems. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWThF I; 207VH.) Mr. Blakey.

NOTE.—A student may not receive credit for both Econ. 189 and Econ. 191-192.

Econ.204su. Seminar in Economic Theory. The topic will be wage theories. An examination of some of the more important of the theories of wages of this century; the productivity analysis, socialist criticism, effects of population change, state interference, and changing techniques on the wage-earner's share in the national income. (3 cred.; grad.; MTWThF VII; 115VH.) Mr. Garver.

SECOND TERM

Econ.7su. Principles of Economics. A continuation of Econ. 6su. (3 cred.; soph., jr., sr.; prereq. Econ. 6; MTWThF III; 105VH.) Mr. Schmidt.

Econ.26su. Principles of Accounting. Problems of income determination such as cost of sales, different methods of sales, inventory problems, manufacturing costs, depreciation, intangibles, nonoperating incomes and expenses, bond interest, capital gains and losses. Review of the financial statements and classifications, introduction to the problem of statement analysis. (3 cred.; soph., jr., sr.; prereq. Econ. 25; MTWThF II; 6VH.) Mr. Reighard.

B.A.102su. Advanced General Economics. (A continuation of B.A. 101su. For the Summer Session this course is the equivalent of Econ. 104.) Theory of the distribution of wealth and income. General distribution theory, wages, rent, and interest. (3 cred.; jr., sr., grad.; prereq. B.A. 101 or Econ. 103; MTWThF III; 6VH.) Mr. Mudgett.

B.A.112su.‡ Business Statistics. Survey and criticism of methods used in

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

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; MTWF IV and 1 hr. ar.; 6VH.) Mr. Mudgett.

B.A.134su. Income Tax Accounting. The legal and accounting principles involved in determining taxable net income and the computation of federal income taxes for corporations and individuals. (3 cred.; jr., sr., grad.; prereq. B.A. 139 or 150-151; MTWThF I; 2VH.) Mr. Reighard.

Econ.140su. The Co-operative Movement. The history and philosophy of various co-operative developments. Similarities and contrasts between such movements as agricultural marketing co-operatives, consumer co-operatives, trade unions, and others. Consumer co-operation as a medium for economic control. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWF IV and 1 hr. ar.; 2VH.) Mr. Vaile.

B.A.146su. Investments. A general survey of the external and internal factors influencing the prices of securities and of the principles of an investment policy for the needs of the average conservative investor. (3 cred.; jr., sr., grad.; prereq. B.A. 155 or Econ. 160; MTWThF III; 2VH.) Mr. Stehman.

B.A.155su. Corporation Finance. Incorporation. (For the Summer Session this course is equivalent to Econ. 160.) The various types of corporate securities and their uses. Financial plans for industrial, utility, and other types of corporations. Financial affairs of an established business. General financial problems of the holding company, consolidations, mergers, and reorganizations. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWThF II; 2VH.) Mr. Stehman.

Econ.161su. Labor Problems and Trade Unionism. A discussion of employment, hours, wages, types of unionism, policies and practices of labor organization. Special emphasis upon economic implications of modern working conditions. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83.; MTWThF I; 6VH.) Mr. Yoder.

B.A.165su. Economics of Public Utilities. (For the Summer Session this course is the equivalent of Econ. 154.) A general course on the economic aspects of government regulation of the finances, rates, and services of municipal public utilities. Economic characteristics, legal position, regulation, valuation, and government ownership are the principal topics covered. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either 6-7 or 83; MTWThF V; 6VH.) Mr. Schmidt.

B.A.167su. Personnel Administration. Evaluation of managerial policies and devices for the control of personnel. Attention is directed especially to the determination of labor needs, methods of contacting workers, selective devices, training and safety programs, compensation. (3 cred.; jr., sr., grad.; prereq. Econ. 161; MTWThF II; 105VH.) Mr. Yoder.

Econ.185su. Economics of Marketing. (For the Summer Session this course may be substituted for B.A. 77.) A general course dealing with (1) the market functions, (2) the organization of marketing enterprises, (3) measures of efficiency in marketing, (4) the manager's administration of marketing. (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83; MTWThF V; 2VH.) Mr. Vaile.

INSTITUTE OF CHILD WELFARE

The Institute of Child Welfare was organized for three purposes: for research on child development; for the training of students and future workers; and for bringing to the people of the state through a parent education program the information accumulated in it and other research centers. Cooperating with the institute in its program are a number of university departments: Anatomy, Education, Home Economics, Nervous and Mental Diseases, Pediatrics, Psychology, Public Health Nursing, Sociology, and the General Extension and Agricultural Extension Divisions.

NURSERY SCHOOL AND KINDERGARTEN

The Nursery School will be in session from 9:00 a.m. to 1:00 p.m. beginning June 19 and closing July 28. Applications for the enrolment of children will be received at the office of the institute. The fee will be $20 for tuition, including orange juice and lunch at noon. A few additional children can be accommodated from 9:00 to 11:45 a.m. with no lunch served but including orange juice at a tuition fee of $15.

The Kindergarten will be in session beginning June 19 and closing July 28, from 9:00 to 11:45 a.m. at a tuition fee of $10, including orange juice. Special arrangements may be made for a few kindergarten children to stay for lunch at a fee of $5 for the term. Children in either the Nursery School or Kindergarten living in the southeast district, may be transported for an additional fee of $8.

FIRST TERM

C.W.10su. Introduction to Child Study. (2 cred.; 3rd qtr. fr., soph.; no prereq.; MTWTh VI; 202Pt.) Mrs. Cummings.

C.W.80su. Child Psychology. (3 cred.; jr., sr.; prereq. Psy. 1-2; MTWThF III and 1 hr. ar.; 202Pt.) Mrs. Foster.

C.W.82su. Later Childhood and Adolescence. (3 cred.; jr., sr.; prereq. Psy. 1-2; MTWThF I and 1 hr. ar.; 202Pt.) Mrs. Cummings.

C.W.132su. The Development of the Elementary School Child. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv. Students receiving credit for Ed.Psy. 148su or Ed.C.I. 187su may not register for C.W. 132su; MTWThF VII and 1 hr. ar.; Tuttle School.) Miss Goodenough.

C.W.140su. Behavior Problems. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.; MTWTh III; 100Pt.) Miss Cushing.

C.W.170su. Parent Education. (2 cred.; sr., grad.; prereq. 15 cred. in child welfare, home econ., ed. psy., soc., or prev. med.; TWThF II and 1 hr. ar.; 202Pt.) Miss Cushing.

C.W.190su. Principles of Mental Measurement of Young Children. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy. or soc.; MTWF IV; 202Pt.) Miss Goodenough.

C.W.270su. Readings in Child Development. (Cred. ar.; grad. students only; hrs. ar.) Mrs. Foster, Miss Goodenough.

C.W.275su. Seminar in Parent-Child Relations. (2 cred.; grad. students only; permission of instructor; hrs. ar.; 204CPt.) Miss Cushing.

The following courses: Ed.T. 55su, Principles of Kindergarten and Nursery Education; Ed.T. 56su, Permanent Play Materials; Ed.T. 59su, Story Telling for Young Children; Ed.T. 76Asu, Methods and Observation in the Nursery School and Kindergarten; Ed.T. 76Bsu, Methods and Observation: Home-School Relations, listed under Methods and Directed Teaching on page 103, and Ed.C.I. 130su, Problems of Childhood Education, listed under Curriculum and Instruction on page 95, are also offered by the Institute of Child Welfare.

SECOND TERM

C.W.40su. Child Training. (3 cred.; soph., jr., sr.; prereq. Psy. 1-2; MTWThF II and 1 hr. ar.; 202Pt.) Mrs. Davis.

C.W.131su. Personality, Emotional, and Social Development. (3 cred.; sr., grad.; prereq. 12 cred. in child welfare or psy. or equiv.; MTWThF III and 1 hr. ar.; 202Pt.) Mrs. Davis.

C.W.270su. Readings in Child Development. (Cred. ar.; grad. students only; hrs. ar.) Mrs. Davis.

LIBRARY INSTRUCTION

FIRST TERM

Academic credit is given only to students with at least two full years of approved work of collegiate grade. Candidates for a degree in library instruction must have had at least *three* years of approved work of collegiate grade in addition to a full year (45 quarter credits) in Library Instruction. "No-credit" students will be admitted only with the approval of the Library Division of the Minnesota State Education Department (in the case of residents of Minnesota) or of the director of the Division of Library Training (in the case of those not residents of Minnesota). Admission of "no-credit" students will be limited to candidates under appointment or promise of appointment to definite library positions. Candidates for "no-credit" standing should in every case present written evidence of such appointment or promise of appointment.

Lib.Meth.57su. Secondary School Libraries. Administrative methods and problems, including methods of teaching the use of the library. (3 cred.; prereq. 9 cred. in library methods; MTWThF III; 5Lib.) Miss Jackman.

Lib.Meth.60su. Library Binding. Economics of library binding. Materials, processes, records, book repair. (1 cred.; no prereq.; TTh VII; 5Lib.) Mr. Shove.

Lib.Meth.62su. 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.; MTWThF I; 5Lib.) Miss Fraser.

Lib.Meth.69su. Current Library Problems. Discussion of typical problems and conditions in American libraries. (3 cred.; prereq. 9 cred.; MTWThF II; 3Lib.) Miss Hutchinson.

Lib.Meth.71su. Library Work with Children. Administration of children's rooms and book selection. (3 cred.; prereq. 9 cred. or 6 cred. and one 3-cred. course in library training simultaneously with 71; MTWThF II; 3Lib.) Miss Herrmann.

Lib.Meth.73su. Selection of Books for Adults. Principles of selection and criticism of representative books. Criticism and preparation of book lists. (2 cred.; no prereq.; MTWF IV; 5Lib.) Miss Hutchinson.

SECOND TERM

Lib.Meth.52su. Cataloging. Elements of dictionary cataloging. Lecture, problems, and practice. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; MTWThF I; 5Lib.) Miss Brainard.

Lib.Meth.54su. Classification. Classification by the Dewey Decimal System, subject headings, author numbers, shelf and accession records. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; MTWThF III; 5Lib.) Miss Brainard.

FACULTY

GRADUATE SCHOOL

Wilford S. Miller, Ph.D., Acting Dean

(The faculty of the Graduate School is included among those listed under the various schools and colleges.)

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

John T. Tate, Ph.D., Dean

ASTRONOMY

Willem J. Luyten, Ph.D., Professor

BOTANY

C. Otto Rosendahl, Ph.D., Professor
Ned L. Huff, M.A., Assistant Professor
Elmer S. Miller, Ph.D., Assistant Professor
Laurence S. Moyer, Ph.D., Assistant Professor
Murry F. Buell, Ph.D., Instructor, University of North Carolina, Lecturer
Donald B. Lawrence, Ph.D., Instructor

CLASSICS

Marbury B. Ogle, Ph.D., Professor
John L. Heller, Ph.D., Assistant Professor

ENGLISH

Alan D. McKillop, Ph.D., Professor
Hyder Edward Rollins, Ph.D., Professor
Martin B. Ruud, Ph.D., Professor
James T. Hillhouse, Ph.D., Associate Professor
Tremaine McDowell, Ph.D., Associate Professor
Charles W. Nichols, Ph.D., Associate Professor
William P. Dunn, Ph.D., Assistant Professor
John T. Flanagan, Ph.D., Assistant Professor
Lewis B. Hessler, Ph.D., Assistant Professor
Elizabeth Jackson, Ph.D., Assistant Professor
Anna H. Phelan, Ph.D., Assistant Professor
Frederick W. Bateson, B.Litt., Professorial Lecturer
Amy Armstrong, M.A., Instructor
Harold E. Briggs, M.A., Instructor
John W. Clark, M.A., Instructor
Edward D. Mallam, M.A., Instructor

FINE ARTS

Laurence Schmeckebier, Ph.D., Assistant Professor

GEOGRAPHY

Darrell H. Davis, Ph.D., Professor
J. Russell Whitaker, Ph.D., Associate Professor
Ralph H. Brown, Ph.D., Assistant Professor
Samuel N. Dicken, Ph.D., Assistant Professor

GEOLOGY

Clinton R. Stauffer, Ph.D., Professor

GERMAN

Frederick Pfeiffer, Ph.D., Assistant Professor
Konstantin Reichardt, Ph.D., Professorial Lecturer
Lynwood Downs, Ph.D., Instructor
Hubert Meessen, Ph.D., Instructor

HISTORY

Theodore C. Blegen, Ph.D., Professor
Lester B. Shippee, Ph.D., Professor
George M. Stephenson, Ph.D., Professor
Ernest S. Osgood, Ph.D., Associate Professor
Harold C. Deutsch, Ph.D., Assistant Professor
Tom B. Jones, Ph.D., Assistant Professor
Alice F. Tyler, Ph.D., Assistant Professor
David H. Willson, Ph.D., Assistant Professor
Charles M. Gates, Ph.D., Lecturer
Guy W. C. Ross, M.A., LL.D., Lecturer
Rodney C. Loehr, Ph.D., Instructor

JOURNALISM

Thomas F. Barnhart, M.A., Professor
Ralph O. Nafziger, Ph.D., Professor
Edwin H. Ford, M.A., M.S., Assistant Professor
Russell I. Thackrey, M.S., Assistant Professor

MATHEMATICS

Dunham Jackson, Ph.D., Professor
Anthony Underhill, Ph.D., Associate Professor
S. Elizabeth Carlson, Ph.D., Assistant Professor
Gladys E. C. Gibbens, Ph.D., Assistant Professor
Howard H. Campaigne, Ph.D., Instructor
Kenneth W. Wegner, Ph.D., Instructor
Fulton Koehler, M.A., Teaching Assistant
William R. McEwen, B.A., Teaching Assistant
Margaret P. Martin, B.A., Teaching Assistant
Leonard W. Swanson, B.A., Teaching Assistant

MUSIC

Carlyle M. Scott, Mus.D., Professor and Director of Music
Donald N. Ferguson, M.A., Professor
Earle G. Killeen, M.Mus., Professor
Arthur B. Jennings, Associate Professor and University Organist
William Lindsay, Associate Professor
Abe Pepinsky, M.A., Associate Professor
Clyde Stephens, Assistant Professor
J. Rudolph Peterson, Instructor
Walther Pfitzner, Instructor
Karl Scheurer, Instructor
Agnes Rast Snyder, Instructor

PHILOSOPHY

Alburey Castell, Ph.D., Assistant Professor
Millard S. Everett, Ph.D., Assistant Professor

PHYSICS

J. William Buchta, Ph.D., Professor
Louallen F. Miller, Ph.D., Professor
Edward L. Hill, Ph.D., Associate Professor
John H. Williams, Ph.D., Associate Professor
John Bardeen, Ph.D., Assistant Professor
Lynn H. Rumbaugh, Ph.D., Assistant Professor

POLITICAL SCIENCE

Oliver P. Field, M.A., S.J.D., Professor
Lloyd M. Short, Ph.D., Professor
Clarence C. Ludwig, M.A., C.P.A., Associate Professor
Lennox A. Mills, Ph.D., Associate Professor
Joseph R. Starr, Ph.D., Assistant Professor
Asher N. Christensen, B.A., Instructor
Evron M. Kirkpatrick, M.A., Instructor
Charles H. McLaughlin, M.A., LL.B., Instructor

PSYCHOLOGY

Charles Bird, Ph.D., Professor
Edward K. Strong, Ph.D., Professor
William T. Heron, Ph.D., Associate Professor
Miles A. Tinker, Ph.D., Associate Professor
Howard P. Longstaff, Ph.D., Assistant Professor
B. Frederic Skinner, Ph.D., Assistant Professor
William S. Carlson, Ph.D., Instructor

ROMANCE LANGUAGES

Edward H. Sirich, Ph.D., Professor
Irville C. LeCompte, Ph.D., Professor

Colbert Searles, Ph.D., Professor
Raymond L. Grismer, Ph.D., Associate Professor
Walter T. Pattison, Ph.D., Associate Professor
Emmert M. Brackney, Ph.D., Assistant Professor
Herbert E. Clefton, Ph.D., Assistant Professor
Jacques A. Fermaud, Licencié, Instructor

SOCIOLOGY AND SOCIAL WORK

Clifford Kirkpatrick, Ph.D., Professor
Lowry Nelson, Ph.D., Professor
George B. Vold, Ph.D., Professor
Anne F. Fenlason, M.A., Associate Professor
Alice Leahy Shea, Ph.D., Associate Professor
Raymond F. Sletto, Ph.D., Assistant Professor
Monica K. Doyle, M.A., Lecturer
Helen E. Hayden, B.S., Lecturer
Elizabeth E. May, Ph.D., Lecturer
Helen U. Phillips, M.S.S., Lecturer
Benjamin E. Youngdahl, M.A., Lecturer
Fern Fisk, B.S., Instructor
Delbert C. Miller, M.A., Instructor
F. Joseph Schneider, Ph.D., Instructor
Ruth H. Swartzott, B.A., Instructor
Robert M. Dinkel, M.A., Teaching Assistant
Edgar C. McVoy, M.A., Teaching Assistant
Marion F. Williamson, M.A., Teaching Assistant

SPEECH

Frank M. Rarig, M.A., Professor
Bryng Bryngelson, Ph.D., Associate Professor
Howard Gilkinson, Ph.D., Assistant Professor
Franklin H. Knower, Ph.D., Assistant Professor
C. Lowell Lees, Ph.D., Assistant Professor
Myfanwy Chapman, B.S., Lecturer
Frank M. Whiting, M.A., Instructor
E. William Ziebarth, Ph.M., Instructor
Spencer F. Brown, Ph.D., Instructor
Reid Erekson, B.A., Teaching Assistant
Henrietta Hull, B.S., Teaching Assistant
William B. Newgord, M.A., Teaching Assistant
Albert Mitchell, Ph.D., Teaching Assistant
Robert Sailstad, M.A., Teaching Assistant

ZOOLOGY

Jerry E. Wodsedalek, Ph.D., Professor
Adolph R. Ringoen, Ph.D., Associate Professor
Magnus Olson, Ph.D., Instructor

INSTITUTE OF TECHNOLOGY

Samuel C. Lind, Ph.D., D.Sc., Dean

College of Engineering and Architecture

Charles A. Koepke, M.S.(M.E.), Administrative Assistant

AERONAUTICAL ENGINEERING

Benjamin F. Ruffner, B.M.E., Instructor

ARCHITECTURE AND FINE ARTS

Robert G. Cerny, M.Arch., Assistant Professor
Elmer E. Young, Assistant Professor
LeRoy Turner, Instructor

CIVIL ENGINEERING

Chester A. Hughes, M.A.Sc., Associate Professor
Joseph A. Wise, B.S.(C.E.), Associate Professor
Paul Andersen, Ph.D., Assistant Professor
Leonard F. Boon, C.E., Assistant Professor

DRAWING AND DESCRIPTIVE GEOMETRY

Henry C. T. Eggers, E.E., Ph.D., Associate Professor
Ivan Doseff, B.S., Assistant Professor
Alex S. Levens, C.E., Assistant Professor
Robert F. Schuck, B.S.(E.E.), Assistant Professor
Lloyd J. Quaid, B.S.(E.E.), Instructor

MATHEMATICS AND MECHANICS

Harry A. Doeringsfeld, C.E., Assistant Professor
Forest E. Miller, M.S., Assistant Professor
Glenn H. Peebles, M.S., Assistant Professor
Edward S. Loye, M.S., Instructor
John S. McNown, M.S., Instructor
F. G. Eric Peterson, M.S., Instructor

MECHANICAL ENGINEERING

Thomas P. Hughes, M.S.(Met.), Assistant Professor
William H. Richards, Assistant Professor
Bert A. Crowder, B.S., Instructor
Fulton Holtby, M.E., Instructor

School of Chemistry

Lloyd H. Reyerson, Ph.D., Administrative Assistant

INORGANIC CHEMISTRY

M. Cannon Sneed, Ph.D., Professor
Hervey H. Barber, Ph.D., Assistant Professor
Gladstone B. Heisig, Ph.D., Assistant Professor

J. Lewis Maynard, Ph.D., Assistant Professor
Norville C. Pervier, Ph.D., Assistant Professor
Edward C. Ballard, B.S. in Chem., Teaching Assistant
Willa B. Irwin, B.A., Teaching Assistant
Richard H. Loeppert, B.S. in Chem., Teaching Assistant

ANALYTICAL CHEMISTRY

I. William Geiger, Ph.D., Associate Professor
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INDEX

Bulletin
of the
University of Minnesota

Biological Station Summer Session

at

Lake Itasca Forestry and Biological Station

Douglas Lodge, Minnesota

Second Term, Summer Session

July 31 to September 1, 1939

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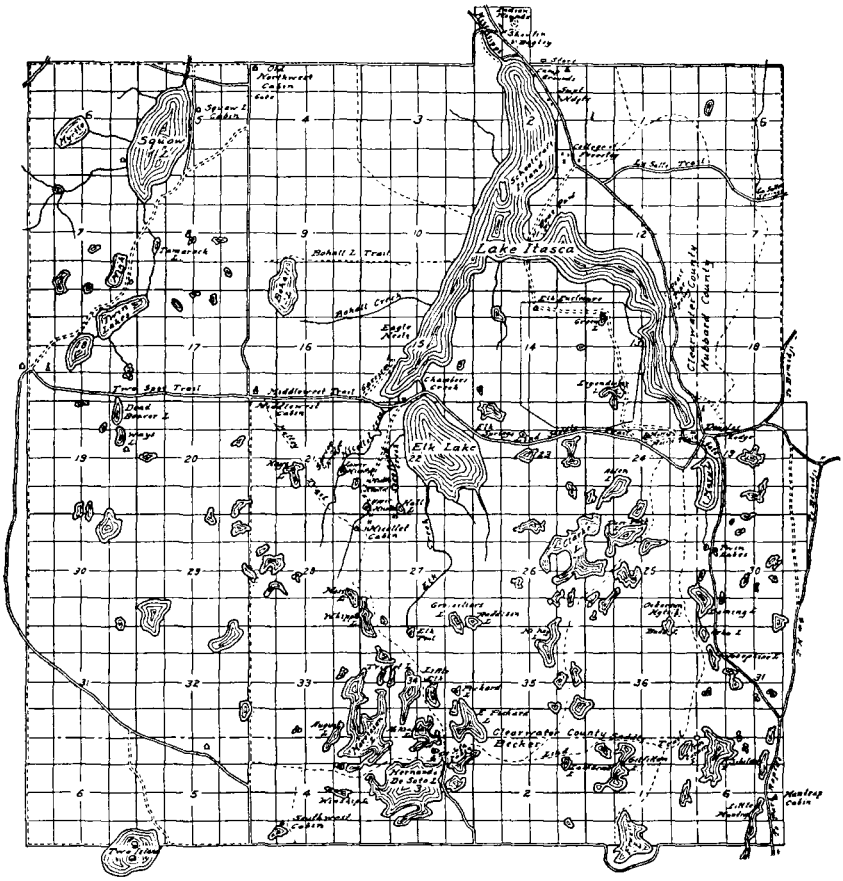

Map of Itasca State Park

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BOTANY

C. OTTO ROSENDAHL, Ph.D., Professor
MURRAY F. BUELL, PH.D., Instructor, University of North Carolina, Lecturer
DONALD B. LAWRENCE, Ph.D., Instructor

ENTOMOLOGY AND ECONOMIC ZOOLOGY

ALEXANDER A. GRANOVSKY, Ph.D., Associate Professor, in charge of station
GUSTAV A. SWANSON, Ph.D., Assistant Professor

FORESTRY

MURRAY F. BUELL, PH.D., Instructor, University of North Carolina, Lecturer

PLANT PATHOLOGY AND BOTANY

CLYDE M. CHRISTENSEN, Ph.D., Instructor

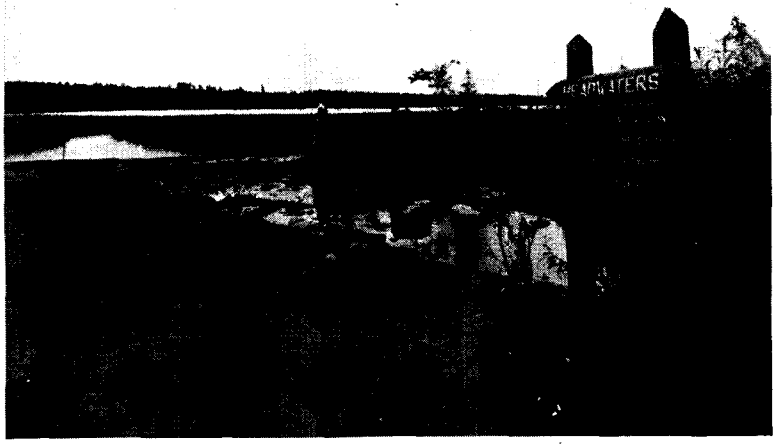
ZOOLOGY

WILLIAM A. RILEY, Ph.D., D.Sc., Professor
SAMUEL EDDY, Ph.D., Associate Professor
JOHN P. TURNER, Ph.D., Assistant Professor
FRANKLIN G. WALLACE, Ph.D., Instructor

INTRODUCTION

The University of Minnesota has maintained since 1908 a Forest School summer session at Itasca State Park for field instruction in forestry, and staff members of the University periodically conducted research studies in forestry, botany, and entomology at Itasca Park. The opportunity in field instruction was primarily open to forestry students during the first term of six weeks of the Summer Session. In recent years there has been an increasing demand on the part of interested students and teachers of biological subjects for the continuation of such opportunities during the second term of the University's regular Summer Session. Because of the unusually rich and varied flora and fauna of the region, Itasca State Park provides a most suitable locality for the study of the vegetation types and wildlife characteristic of the midwestern states. No other geographic area in this region is better suited to the location of a field station of terrestrial and fresh-water biology.

To satisfy this demand, the Biological Station Summer Session of the University of Minnesota was organized, and the first session of the station was held at Itasca Park in the summer of 1935 with an encouraging registration. In the last four years it made unusually fine progress and now the Biological Station Summer Session of the University of Minnesota bids fair to become one of the leading biological stations of terrestrial and fresh-water biology in the United States.



At the Source of the Mississippi River

LOCATION AND OPPORTUNITIES FOR BIOLOGICAL WORK

The highly diversified flora of the state of Minnesota with merging of prairies, hardwood and coniferous forests, together with the glaciated and unglaciated areas, sand dunes, and numerous inland lakes, both large and small, provide a wide variety of habitats for plant and animal life, resulting in a great diversity of plant and animal types which is especially attractive to biologists and students, as well as to all others interested in nature study and conservation.

Forest Trail Along the Inviting Lake Shore

The Biological Station Summer Session of the University of Minnesota is situated on the east shore of Lake Itasca in Itasca State Park in the north central part of the state, about equidistant from Park Rapids, Walker, and Bemidji. The side of the station extends along the beautiful shore of the lake, the source of the Mississippi River, only a mile away from a group of ancient Indian mounds, and is surrounded by virgin forests and innumerable lakes. The station is accessible from all directions by excellent automobile highways.

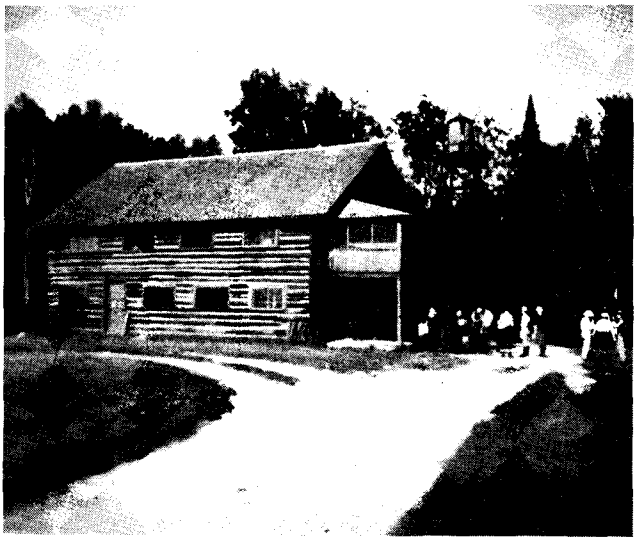
Itasca State Park is seven miles square and covers an area of approximately 32,000 acres of hardwood and evergreen forests, including about 5,000 acres of lakes, with a diverse series of habitat furnishing a characteristic succession of plants and animals. Lake Itasca is 1,467 feet above sea level. Only a short distance west of Morrison and De Soto lakes, within the park

One Is Never Too Tired To Watch the Rainbow of Colors Each Evening from the Shore of the Station

Amidst the Whispering Pines

is a continental divide, which at this point is 1,670 feet above the sea. From the highlands of the park descend waters that flow both into Hudson Bay through the Red River of the North and into the Gulf of Mexico through the Mississippi River. The length of the Mississippi from Lake Itasca to the Gulf of Mexico is 2,546 miles.

The wooded shores of Lake Itasca, as well as many other lakes within the park, are readily accessible by the well-marked trails, which lead in various directions through dense hardwood forests, large tracts of virgin pine, rising terraced bluffs, or richly verdured swamps and bogs to numerous beaver dams, eagle nests, elk and deer herds, and to floating bog, as well as to other points of interest. The magnificent forests of certain parts of



A Class in Field Botany Assembled Near Laboratory for Field Trip

Itasca Park comprise almost pure as well as mixed stands of conifers such as white, Norway, and jack pines, black and white spruce, balsam, larch, and—what is rare in this region—a few white cedars. The hardwood forests are rich in dense stands of all ages, and are characterized by such trees as hard and soft maples, white and yellow birches, poplars, aspens, oaks, elms, and other trees. The undergrowth is equally rich with ground covers of unsurpassed variety of vegetation characteristic of various habitats found in close proximity. Just on the outskirts of the park lies a large tract of recently acquired state forest, where some of the areas have been lumbered and swept by repeated fires and now present the unusual diversity of both flora and fauna in various stages of development and ecological succession. Only twenty miles to the east, at Cass Lake, lies the Chippewa National Forest, perhaps the best developed forest in the Lake States region. A little more than twenty miles to the west of the park is the old Lake Agassiz

basin with the famous wheat growing prairies of the Red River Valley. Not much farther to the north, within the Indian reservation, lies the Upper and Lower Red Lake—a large body of shallow water, surrounded by mixed forest. All of these areas are easily accessible from the Biological Station and offer unsurpassed opportunities for biological studies.

The wealth of flora and fauna provides advantages for the study of systematic botany, zoology and entomology, parasitology, and mycology, or for monographing the insect fauna, protozoa, algae, lichens, mosses, higher plants, terrestrial and aquatic invertebrates, as well as developmental stages of parasitic forms, infesting alternate hosts and vertebrates. The abundance of fish, birds, and wild game in their natural habitats offers a unique field

What a Thrill To Study Plants on a Field Trip with a Well-Informed Instructor

laboratory in the subjects of ecology, limnology, parasitology, and of wild game conservation and management for the purpose of research and instruction. The field courses, as offered at the Biological Station Summer Session at Lake Itasca Forestry and Biological Station, make the animal and plant life of the region vividly real, acquainting the students with characteristic animal and plant populations living and struggling under natural conditions of various habitats so abundantly found in Itasca Park and vicinity.

INSTRUCTION

The Biological Station Summer Session of the University of Minnesota was established for the advancement of terrestrial and fresh-water biology in its most fundamental aspects. To this end it promotes and provides oppor-

tunities for instruction and research, as well as training scientific investigators, in the fields of terrestrial and fresh-water biology. Through these activities it hopes to stimulate and promote a better knowledge of the rich flora and fauna found in the midwestern and Lake States region and surrounding areas having similar geological history.

This station is conducted co-operatively by various departments in the College of Agriculture, Forestry, and Home Economics and the College of Science, Literature, and the Arts of the University of Minnesota.

It offers elementary and advanced courses in the fields of biology under the excellent conditions furnished at Itasca Park. Opportunities are also offered for research and investigation in several fields of biology.

A Group of Students on Their Field Trip

The interested students may find the following opportunities offered by the Biological Station Summer Session at Itasca Park:

1. Elementary and advanced instruction during the five weeks of the second term of the University Summer Session (July 31 to September 1) for college undergraduates, graduate students, high school and nature study teachers, and others interested.
2. Opportunities to graduate students who may wish to pursue biological investigations in the lakes, fields, or forests close to the station.
3. Opportunities to teachers of botany, zoology, and biology as well as to guest investigators for independent research in terrestrial and fresh-water biology.
4. Symposia are arranged on qualitative and quantitative population trends and faunistic studies of terrestrial and fresh-water biology.

Courses, consisting of field trips and indoor laboratory work, are given on designated days. In the field the students visit typical habitats and gather specimens for laboratory study, supplemented by informal lectures by the

Laboratory Class in Limnology

Students in Field Entomology Classifying Daily Collections of Insects in the Indoor Laboratory

instructors in charge of each tour. The same scholastic standards are maintained at the station as on the campus of the University of Minnesota, and university credit is given for work satisfactorily accomplished in the courses registered. Some may prefer, however, to take courses for self-improvement without credit. The station's grounds are regarded as a third campus of the University of Minnesota.

FACILITIES FOR INSTRUCTION AND RESEARCH

The buildings and equipment of the Biological Station Summer Session of the University of Minnesota at Itasca Park provide ample physical plant and accommodations. By the shore of Lake Itasca stand its laboratories and dormitory cabins of rough, uncut logs amidst whispering pines, birches

Main Forestry Lodge and One of the Log Cabins Used for Student Dormitories

and other hardwoods. The main Forestry Lodge with assembly room and a large fireplace provides the meeting place for some classes and evening symposia. The main laboratory of the station is a large, well-lighted, two-story log building, provided with laboratory tables, desks, chairs, a fine herbarium of the region, insect collections, and other specimens for study. There is a fine new building, with insectary, for the entomology laboratory, and the library building is also available for class purposes. The entire camp grounds and all laboratory and dormitory buildings are electrically lighted.

Since the chief instruction will be in the field, the equipment of the station is not elaborate. It is, however, adequate for all ordinary purposes. It includes an electrically lighted laboratory space, an insectary, a library, all necessary compound and dissecting microscopes, binoculars, launches, rowboats, various types of nets, and a supply of accessories and minor equipment indispensable for adequate instruction and research purposes.

A Row of New Log Cabins Used for Women's Dormitories

White Paper Birches Bedeck the Cottage Trail

The upper story of the main laboratory building is outfitted with tables and shelves for advanced students and independent research workers, especially for those who may reserve such space in advance. It is hoped that the various colleges and universities of this state and the neighboring states may reserve a few research tables by the establishment of scholarships at the Biological Station Summer Session for their most promising students interested in some field of biology.

Hungry Students after Field Trip Entering the Dining Hall

BOARD AND LODGING

The Forestry Lodge is provided with roomy screened-in porches on both the first and second floors. The sleeping quarters are equipped with cots and mattresses. This building has a large recreation room with a fireplace where the comforts of home are combined with the invigorating freedom of healthy camp life. Special cottages, each of which can accommodate from four to eight students, are assigned for women's dormitories. All dormitories are provided with cots and mattresses, electric lights, heat, if necessary, running water, and toilet facilities. Students are asked, however, to bring with them their own bed linen, two or three double wool blankets, a small pillow, if desired, and toilet articles. In addition to this, the following personal belongings will be useful: suitable shoes for field work, a slicker or other waterproof garment, field suit or dress, swimming suit, electrical attachments, desk lamp, flashlight, and a few recommended and necessary textbooks, notebooks, pocket field books, pencils, hand lenses, dissecting sets and pins, vials and corks, and other articles for field trips, laboratory work, and camp life. These articles will outfit each student for a pleasant and profitable five weeks of study under unusual surroundings at Itasca Park. Students are especially urged to bring with them the recommended textbooks, supplies, and accessories necessary for each course in which they may be registered, for it is difficult, far away from bookstores and source of

supply, to obtain these items on time. Special orders also involve additional transportation expenses. Write, if necessary, for the list of textbooks and accessories recommended for given courses. It will be difficult to take care of trunks.

Dining Hall at the Biological Station

Meals are served in a separate and completely equipped log dining hall, which will be operated under the general direction and supervision of the administration of the station and the kitchen manager in consultation with the officers of attending students. The meals are carefully planned, well balanced, and well prepared by experienced cooks and are attractively served in ample quantities. Meat, vegetables, and fruit are served every day. A new well supplies pure, cold water and the air is delightfully cool and refreshing.

Since the kitchen is operated by experienced cooks and the treasurer of the commissary especially engaged for it, the officers of the student association are to take care of their social functions only.

It is estimated on the basis of the experience of other groups of students that the cost of board should not exceed the total of $30 for the five-week period, or about 86 cents per day for three well-balanced meals of excellent quality and plentiful quantity. For this wholesome and well-diversified board a minimum charge of $30 will be made, which should be paid at Itasca Park to the treasurer of the commissary during the first few days of the station session. If food prices should in the meantime be advanced, it may be necessary to make additional charges. It is the policy of the station to give plenty of fresh and wholesome well-balanced food without undue waste, for as reasonable cost as possible. The resulting quality and cost of board will be determined by the administration and the officers of attending students. If there should be a balance of the board fund left at the end of the session, the attending students will have an opportunity to suggest where this fund should be used for the improvement most needed at the station.

Laundry facilities are also available, tho it is possible to have laundry done periodically in nearby cities and villages.

About one mile south of the station's campus the State Park administration maintains large public camp grounds and those with families may avail

themselves of the opportunities and facilities which include water, fuel, and swimming beach. There are numerous resorts in the vicinity of the station to accommodate families of the graduate students and guest investigators.

The Wealth of Protozoa and Algae Is Enjoyed by Students

FEES AND EXPENSES

The following fees are payable by each registrant on or before July 31, and must be paid before registration is completed:

Tuition fee	$21.80
Health fee	1.00
Total tuition fee	$22.80
Equipment fee	10.00
General deposit fee	2.00
Total fee for the term	$34.80

The equipment fee includes the use of microscopes, reference books, nets, boats, various class supplies, and accessories.

Charges for lockers, laboratory, breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

The estimated cost of $64.80 includes $34.80 registration fee and $30 for board for the five-week session. It does not include traveling expenses, clothing, laundry, and minor incidental personal expenses.

Tuition and fees are payable at the time of registration directly to the registrar of the University of Minnesota on or before July 31. After July 31 the late registration fee will be charged according to the following schedule:

Tuesday, August 1	$2.00
Wednesday, August 2	3.00
Thursday, August 3	4.00
Friday, August 4	5.00

No registration will be accepted after August 4 without the approval of the professor in charge and payment of a $5 fee.

The sum of $30 for the board of five-week period is to be paid at Itasca Park to the treasurer of the commissary during the first few days of the station session.

Class Returning from Field Trip

The courses to be given at the Biological Station Summer Session will begin Monday morning, July 31 and close September 1. Special arrangements, not, however, at the sacrifice of the quality of work, will be made for those whose school or other duties make it impossible to remain through the final week of the session.

ADMISSION AND REGISTRATION

The courses in the Biological Station Summer Session are open to all qualified graduate and undergraduate students who have had the usual preliminary courses in biological subjects, as well as to properly qualified high school graduates. Certain courses are especially designed for the teachers of biological subjects in colleges, high schools, and public schools, and others interested in plant and animal life. Those desiring college credit should submit their credentials, consisting of official transcripts of their high school, normal school, or college work.

Registration may be completed at any time during the months of June and July, but not later than July 31, at the registrar's office on either campus of the University of Minnesota, complying with existing rules of the University. Application for admission to the station should be made on a form which may be obtained upon request by mail from the registrar's office. Registration may also be completed by mail by sending the properly filled out registration blanks together with the tuition fee directly to the registrar.

Graduate registrations must be approved by the major department and then submitted to the Graduate School for final approval.

As will be noted most of the subjects are offered on a three-credit basis per session. Each three-credit course will occupy two designated days from 8:00 a.m. to 4:30 p.m., with the exception of a noon hour. Ordinarily students take from six to eight or nine credits of quarter value per session, depending upon their interests, necessity for the credits, and ambition. The minimum load is considered to be six credits, and students will not be permitted to carry a lighter load of work without the consent of the faculty. It is considered that the nine-credit load is too heavy for most of the students. Some students prefer to take two subjects to the extent of six credits and in addition they may audit a third course for review purposes or self-improvement. Advanced students are encouraged to take two subjects, total of six credits, and in addition to take one or two credits of a well-delimited research problem.

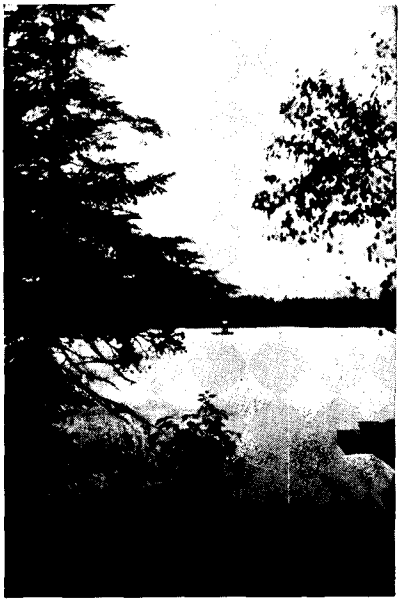
Along the Shore Near the Biological Station

Opportunities are also offered to the graduate students to pursue their research problem work under the supervision and guidance of the staff, without attending regular classes.

Special arrangements can be made, upon request, for properly qualified independent guest investigators to conduct their research work in various fields of terrestrial and fresh-water biology under natural environment, using the laboratory facilities of the station.

The graduate students should note that only courses numbered 100 and above are considered of graduate value. The courses below 100 are of undergraduate standing. Many teachers and graduate students take these courses, however, in order to improve their teaching methods, to remove prerequisite subjects, and to equip themselves for future work toward advanced degrees.

Examining the Rich Catch of Aquatic Animals



A Dock and Diving Board with Clean, Cool Water

The courses offered at the station will be given according to the following schedule:

SCHEDULE OF COURSES

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Bot. 11	Bot. 62	Bot. 8	Bot. 11	Bot. 62	Bot. 8
Bot. 20	Ent. and Econ.	Bot. 115	Bot. 20	Ent. and Econ.	Bot. 115
Ent. and Econ.	Zool. 59	Bot. 135	Ent. and Econ.	Zool. 59	Bot. 135
Zool. 68	Ent. and Econ.	Ent. and Econ.	Zool. 68	Ent. and Econ.	Ent. and Econ.
Zool. 107	Zool. 62	Zool. 76	Zool. 107	Zool. 62	Zool. 76
Zool. 116	Pl.Path. 50	For. 11	Zool. 116	Pl.Path. 50	For. 11
Zool. 147	Zool. 54	Zool. 55	Zool. 147	Zool. 54	Zool. 55
	Zool. 108			Zool. 108	

The schedule for other courses and research problems will be arranged to suit individual needs.

For the 1939 session not more than one hundred (100) applicants can be admitted, and the priority of registration will govern admission.

View from the Windows of Students' Dormitories

The Biological Station at Itasca Park can be reached by railroads either to Park Rapids or Bemidji, Minnesota, and then by bus to Douglas Lodge at Itasca State Park. It also can be reached by the regular bus line, passing through the park going northward from Park Rapids to Bemidji, or going southward from Bemidji to Park Rapids with the stop at Douglas Lodge, where arriving students will be met July 31 and August 1.

Mail to the students should be addressed to the Biological Station Summer Session of the University of Minnesota, Lake Itasca Forestry and Biological Station, Douglas Lodge, Minnesota.

Advanced Students Reach the Most Inaccessible Places by Light and Safe Boats

A Group of Students and the Staff in Attendance Last Year

COURSES OF INSTRUCTION

The following courses are offered in the Biological Station Summer Session for the year 1939 at Itasca State Park. The University of Minnesota reserves the right to cancel any course in which, in the opinion of the director of the Summer Session, the registration is insufficient to warrant a continuation of such course.

BOTANY

8su. Elements of Field Taxonomy. The identification of common wild flowers, and a general study of the classification and relationship of flowering plants. Field work in forest, swamp, bog, lake, and prairie. (3 cred.; prereq. Bot. 1, or consent of instructor; WS.) Mr. Buell.

11su. Field Botany. A general elementary field course in plant life. Fundamental facts of structure, growth, reproduction, relation of plants to each other and to their environment. Excursions with lectures and demonstrations to meet the needs of teachers of elementary botany and nature study, scout and camp leaders, and all who would know more about Minnesota plant life. (3 cred.; no prereq.; MTh.) Mr. Buell.

20su. Elementary Field Ecology. An outline of the fundamental concepts of ecology illustrated directly by examples in the field. A study of the mature plant communities and the various lines of succession leading to them. (3 cred.; no prereq.; MTh.) Mr. Lawrence.

62su.‡ Bryophytes and Pteridophytes. A study of the structure, life histories, and classification of liverworts, mosses, and ferns. Textbook: Coulter, Barnes, and Cowles, *Textbook of Botany*, Vol. 1. (3 cred.; jr., sr.; prereq. Bot. 10 cred., or consent of instructor; TF.) Mr. Rosendahl.

115su. Advanced Taxonomy of Flowering Plants. Advanced work in classification and relationships of flowering plants. Field trips, laboratory, and lectures. Text required: *Gray's New Manual of Botany* or any other manual approved by instructors. (3 cred.; prereq. Bot. 10 cred. incl. Bot. 7; WS.) Mr. Rosendahl.

135su.‡ Field Research Methods in Ecology. An advanced course in field ecology dealing chiefly with methods of studying community characteristics, rate of vegetational change, and the technique of measuring environmental influences. (3 cred.; prereq. botany 18 cred. incl. Bot. 21 or equiv.; WS.) Mr. Lawrence.

196su. Special Problems in Ecology or Taxonomy. Advanced studies in ecology or taxonomy with opportunity for individual field work and research. (Cred. ar.; adv. students with proper qualifications.) Mr. Rosendahl, Mr. Lawrence.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

59su. Field Entomology. A study of the insect fauna in various natural habitats of the park and surrounding areas. The course includes field trips, collections and classification of insects, as well as studies of general

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

morphology, life histories, and habits of local species under ecological conditions governing the distribution of insect fauna of the region. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.; TF.) Mr. Granovsky.

62su. Wildlife Conservation. Principles and Administration. A general course dealing with the various values of wildlife, the nature of the biological mechanism involved in its conservation, and the economic, administrative, and legislative considerations of a conservation program. Treats of the values of wildlife, attitudes toward this resource, the essentials of wildlife environments, the requirements of the various species, and species and population properties. Lectures, laboratory, and field work. (3 cred.; prereq. Zool. 1-2-3 or equiv.; TF.) Charges for car mileage for field trips in this course will average $4 to $5 per student. Mr. Swanson.

68su. Natural History of the Higher Vertebrates. Life histories, habits, economic importance, and identification of amphibians, reptiles, birds, and mammals, with special reference to the local species. References: Pratt, *Manual of Vertebrate Animals of the United States;* Wright, *Handbook of Frogs and Toads;* Peterson, *Field Guide to the Birds.* (3 cred.; prereq. Zool. 1-2-3 or equiv.; MTh.) Charges for car mileage for field trips in this course will average $4 to $5, or one cent per mile per student. Mr. Swanson.

76su. Techniques of Field Biology. A study of available flora and fauna including the methods of collection, preservation, arrangement, and demonstration of illustrative material and effective presentation to classes. Lectures, laboratory, and field work by the entire staff of the station, each instructor presenting the selected methods in his respective field. This course is primarily designed to meet the needs of teachers of biological subjects. Text recommended: Miller and Blaydes, *Methods and Materials for Teaching Biological Sciences.* (2 cred.; prereq. botany or zoology 10 credits or consent of instructor; WS.) Mr. Granovsky and staff of the station.

196su. Special Problems in Entomology or Economic Zoology. Advanced work in entomology and economic zoology with ample opportunity for individual research, especially in various phases of faunistic studies in terrestrial, aquatic, and forest entomology and economic zoology. (Cred. ar.; adv. students with proper qualifications.) Mr. Granovsky, Mr. Swanson.

FORESTRY

11su. Field Dendrology. Trees and shrubs found in the Itasca Park region, with special reference to identification by means of constant characters. (Not open for credit to students in Forestry.) Text required: Rosendahl and Butters, *Trees and Shrubs of Minnesota.* (3 cred.; prereq. botany 10 cred. or consent of instructor; WS.) Mr. Buell.

PLANT PATHOLOGY AND BOTANY

50su. Field Mycology. Taxonomy and classification of fungi, particularly mushrooms, wood rotting fungi, and those which cause disease of forest trees. Field collections, laboratory work, and lectures. (3 cred.;

prereq. one year of botany or equiv., or consent of instructor; TF.) Mr. C. Christensen.

210su. Research in Mycology. Research work along following suggested lines: taxonomy of natural groups, fungus flora of particular regions. localities, or habitats; investigation of fungi involved in special industrial or natural processes; morphology or physiology of special forms. (3 cred.; grad.; prereq. 105-106-107.) Mr. C. Christensen.

ZOOLOGY

54su. Parasitology. A study of animal parasites and parasitism in lecture, laboratory, and field work, with special emphasis on local forms. Text required: Riley, *Introduction to the Study of Animal Parasites and Parasitism.* References: Hegner, Root, and Augustine, *Animal Parasitology with Special Reference to Man and Domesticated Animals,* and Brumpt, *Précis de Parasitologie.* (3 cred.; prereq. zoology 15 cred.; TF.) Mr. Wallace.

55su. Natural History of Invertebrates and Fishes. A survey of the local fauna, including life histories and habitats. Text required: Needham and Needham, *Guide to the Study of Fresh Water Biology.* (3 cred.; prereq. Zool. 1-2-3 or equiv.; WS.) Mr. Eddy.

107su. Protozoology. A survey of the Protozoa, with special reference to their structure and life histories. Text (recommended): Kudo, *Handbook of Protozoology.* (3 cred.; prereq. zoology 15 cred.; MTh.) Mr. Turner.

108su. Advanced Protozoology. Continuation of 107, with emphasis on methods of collection, cultivation, and preparation of free-living and some parasitic forms. Introduction of cytology of Protozoa also included. (3 cred.; prereq 107, or may be taken with 107; TF.) Mr. Turner.

116su. Limnology. A study of the conditions of life and the distribution of organism in the lakes of the Itasca region. Text required: Welch, *Limnology.* References: Ward and Whipple, *Fresh-Water Biology,* or Needham and Needham, *Guide to the Study of Fresh Water Biology.* (3 cred.; prereq. zoology 15 cred.; MTh.) Mr. Eddy.

147su. Helminthology. A survey of the worm parasites of local animals with special emphasis on classification and the study of life cycles by the experimental method. (3 cred.; prereq. Zool. 51, 54, or 144; MTh.) Mr. Wallace.

198su. Problems in Parasitology or Limnology. Principles and further work on special lines adapted to needs of individual students. (Cred. ar.; prereq. Zool. 1-2-3, and special requirements; adv. students.) Mr. Riley, Mr. Eddy, Mr. Wallace.

For further information address the registrar of the University of Minnesota, the Director of the Summer Session, 235 Administration Building. University of Minnesota, Minneapolis, Minnesota, or the Acting Director of the Biological Station, University of Minnesota, University Farm, St. Paul, Minnesota.

Recreation Hours on Beautiful Lake Itasca

The Bulletin *of the* University *of* Minnesota

The Law School

Announcement for the Years

1939-1941

Vol. XLII *No. 16* *April 10 1939*

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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 89 of the 195 law schools in the United States.

The University of Minnesota Law School has been a member of the Association of American Law Schools since the association was organized.

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

Guy Stanton Ford, Ph.D., LL.D., Litt.D., 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
Henry L. McClintock, Ph.B., LL.B., S.J.D., Professor of Law
James Paige, M.A., LL.M., Professor Emeritus
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 G. Jennings, M.A., LL.M., Associate Professor of Law
Edward S. Bade, B.A., LL.M., Assistant Professor of Law
Kenneth H. Baker, Ph.D., Assistant Professor of Psychology
Alburey Castell, Ph.D., Assistant Professor of Philosophy
Stanley V. Kinyon, B.A., LL.B., Assistant Professor of Law
Stefan A. Riesenfeld, LL.B., J.U.D., Instructor in Law
Richard H. Bachelder, B.A., LL.B., Instructor in Practice
John F. Bonner, LL.B., Instructor in Practice
Paul S. Carroll, B.A., LL.B., Instructor in Practice
Leo N. DeMoully, 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 195 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 they 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 development of 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 the 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 become 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 at the Minnesota bar.

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 100,000 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 at 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 registrar 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.

Students beginning the study of law, 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 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 requirements for registration for the degree of bachelor of laws are stated below. (See Prelaw Course; also 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. Philospohy 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.	

* 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.

Suggested electives are: English History or American History, Natural Science, Economics, Political Science, Sociology, and Speech.

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 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 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.

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 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.

FEES

Quarterly resident tuition fees	$40.00
Quarterly nonresident tuition fees	65.00
Credit hour fee (resident)	3.75
Credit hour fee (nonresident)	6.25
Quarterly incidental fee	8.00
Deposit fee (first quarter only)	15.00
Special fees	
Examination for removal of conditions	1.00
Special examination	5.00
Graduation fee	7.50
Large diploma fee	5.00

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 registrar of the University. The estimated expenses of a law student who is a resident of Minnesota, are approximately $600 per year.

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 $20,000 donated by alumni and friends of the Law School.

Law Faculty Loan Fund.—Approximately $5,000 donated by members of the Law School faculty.

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.

* See Bulletin of General Information, page 55, for the provisions as to late fees for late registration.

COURSES 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 completec. this course may go on to the bachelor of laws degree upon the conditions stated below.

The degree of bachelor of science in law with distinction is awarded, on vote of the faculty, to students who have made a high average in prelaw and law school work. The degree of bachelor of science in law with high distinction is awarded, on vote of the faculty, to students who, in addition, have demonstrated on the Editorial Board of the *Minnesota Law Review* or otherwise, unusal ability in original work.

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, jurisprudence, legislation, and either administrative law or trade regulation and labor law. 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.

The degree of bachelor of laws with distinction is awarded, on vote of the faculty, to students who have made a high average throughout their course in the Law School. The degree of bachelor of laws with high distinction is awarded, on vote of the faculty, to students who, in addition, have demonstrated on the Editorial Board of the *Minnesota Law Review* or otherwise, unusual ability in orginal work.

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. Mechem, *Cases on Agency* (2nd ed.). 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. Mikell, *Cases on Criminal Law and Procedure* (3rd ed.). 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. Rottschaefer, *Cases on Constitutional Law.* Two hours. Mr. Rottschaefer.

Equity II. McClintock, *Cases on Equity*. Two hours. Mr. McClintock.

Private Corporations. Richards, *Cases on Private Corporations* (3rd ed.). 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 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. Stason, *Cases on Administrative Tribunals*. 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.

Comparative Law. The aim of the course is to promote a fuller understanding of the growth and technique of American law by comparison with the legal systems on the European continent. Emphasis will be laid in the first part of the course on the historical evolution of the legal systems with particular regard to underlying principles in the judicial process and the fundamentals of the law of contracts; in the second part special attention will be devoted to modern problems in particular fields such as administrative and labor law. Knowledge of foreign languages is not required. Two hours. Mr. Riesenfeld.

Conflict of Laws. Cheatham, Dowling, and Goodrich, *Cases on Conflict of Laws*. Two hours. Mr. Read.

Creditors Rights. Hanna, *Cases on Creditors Rights* (2nd ed.). The course deals principally with remedies of unsecured creditors covering execution of judgement, 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. Riesenfield.

Damages. Beale, *Cases on Damages* (3rd ed.). Two hours, half year.

Equity III and Quasi-Contracts. Cook, *Cases on Equity*, Vol. III. Two hours, half year. Mr. Jennings.

Evidence. Hinton, *Cases on Evidence*. Two hours. Mr. Cherry.

Federal Jurisdiction. Dobie, *Cases on Federal Procedure*. Two hours, half year. Mr. Jennings.

Insurance. Vance, *Cases on Insurance*. 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, quali-

fications and organization of the legal profession, the jury, problems of procedure, and reforms adopted and advocated. Mimeographed readings. 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.* 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.

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.

Persons. McCurdy, *Cases on the Law of Persons and Domestic Relations.* Two hours, half year. Mr. Paige.

Pleading. Clark, *Cases on Pleading and Procedure* (one-vol. ed.). Two hours. Mr. Pirsig.

Practice and Practice Court. Sunderland, *Cases on Trial and Appellate Practice* (1924 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. Bachelder, Mr. Bonner, Mr. Carroll, Mr. DeMoully.

Property III. Future interests at common law and under Minnesota statutes. Leach, *Cases on Future Interests,* and assigned cases. Two hours, half year. Mr. Fraser.

Psychology and Law. Burtt, *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, dection of guilt, and other more general contributions of psychology. Two hours, half year. Mr. Baker.

Public Utilities. Robinson, *Cases on Public Utilities.* Two hours, half year.

Suretyship. Arant, *Cases on Suretyship* (2nd ed.). Two hours, half year. Mr. Paige.

Taxation. Rottschaefer, *Cases on Taxation* (2nd ed.). Two hours, half year. Mr. Rottschaefer.

Trade Regulation. Oliphant, *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 1938-39

First year class	131
Second year class	99
Third year class	66
Fourth year class	40
Total	336

The Bulletin *of the* University *of* Minnesota

Combined Class Schedule

for 1939-1940

One copy of this schedule is issued without charge to each student in the Colleges of Science, Literature, and the Arts; Education; Agriculture, Forestry, and Home Economics; and the School of Business Administration. Additional copies are obtainable at the Engineers Book Store—17, 18 Engineering Building.

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CONTENTS

UNIVERSITY CALENDAR

1939-40

Fall Quarter

1939			
September	18	Monday	Extension registration first semester begins
September	21	Thursday	Payment of fees closes, except for new students[1]
September	25	Monday	Entrance tests
September	25-26		Registration for Freshman Week for all new students entering the freshman class
September	25-29		Examinations for removal of conditions Physical examinations Registration period,[2] College of Science, Literature, and the Arts
September	27-30		Freshman Week
September	28-29		Registration days[2] for all colleges not included above
October	2	Monday	Fall quarter classes begin 8:30 a.m.[3] First semester extension classes begin[4]
October	7	Saturday	Last day for extension registration without penalty
October	19	Thursday	Senate meeting, 4:30 p.m.
October	21	Saturday	Homecoming Day
November	11	Saturday	Armistice Day; a holiday
November	25	Saturday	Dad's Day
November	30	Thursday	Thanksgiving Day; a holiday
December	15-16 and 18-21		Final examination period
December	21	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends, 6:00 p.m.[5]

Winter Quarter

December	28	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1940			
January	2	Tuesday	Entrance tests
January	2-3		Registration[2] for new students in all colleges
January	4	Thursday	Winter quarter classes begin 8:30 a.m.[3]
January	22	Monday	Extension registration second semester begins
February	3	Saturday	First semester extension classes close
February	5	Monday	Second semester extension classes begin[4]

See footnotes on page 4.

February	10	Saturday	Last day for extension registration without penalty
February	12	Monday	Lincoln's Birthday; a holiday (except for extension)
February	15	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Thursday	Washington's Birthday; a holiday (except for extension)
March 15-16 and 18-21			Final examination period
March	21	Thursday	Commencement Convocation Payment of fees closes for all students[1] in residence winter quarter Winter quarter ends, 6:00 p.m.

Spring Quarter

March	29	Friday	Entrance tests
March	29-30		Registration[2] for new students in all colleges
April	1	Monday	Spring quarter classes begin, 8:30 a.m.[3]
May	11	Saturday	Mother's Day
May	16	Thursday	Cap and Gown Day Convocation Senate meeting, 4:30 p.m.
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Second semester extension classes close
June 7-8 and 10-14			Final examination period
June	9	Sunday	Baccalaureate service
June	14	Friday	Spring quarter ends, 6:00 p.m.
June	15	Saturday	Sixty-eighth annual commencement

Summer Session

June	17-18		Registration, first term
June	19	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Thursday	Independence Day; a holiday
July	25	Thursday	Commencement Convocation
July	26	Friday	First term closes
July	29	Monday	Registration and payment of fees for second term close Second term classes begin 8:00 a.m.
August	30	Friday	Second term closes

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also late fees for late registration, page 55, 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.

[3] First hour classes begin at 8:15 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes continue to Saturday, December 23, and will resume Tuesday, January 2, 1940.

DIRECTORY OF ADMINISTRATIVE OFFICES

ADMINISTRATION

Guy Stanton Ford, Ph.D., LL.D., Litt.D., President	Adm202
Anne Dudley Blitz, M.A., LL.D., Dean of Women	ShH
Edward E. Nicholson, M.A., Dean of Student Affairs	Adm213
Rodney M. West, B.A., Registrar	Adm105

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

John T. Tate, Ph.D., Dean and Professor of Physics	Adm219
Joseph M. Thomas, Ph.D., Assistant Dean for the Senior College and Professor of English	F217
William H. Bussey, Ph.D., Assistant Dean for the Junior College and Professor of Mathematics	F106
Royal R. Shumway, B.A., Assistant Dean for Students' Work and Associate Professor of Mathematics	Adm219

COLLEGE OF EDUCATION

Wesley E. Peik, Ph.D., Dean and Professor of Education	Bu204
William S. Carlson, Ph.D., Principal of the High School, Assistant Professor of Education, and Director of Student Teaching	UHS105
Jean H. Alexander, M.A., Chairman of Students' Work Committee and Instructor in Education	Bu206
Horace T. Morse, M.A., Director of Bureau of Recommendations and Instructor in Education	Bu208

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

Walter C. Coffey, M.S., LL.D., Dean and Director of the Department of Agriculture	Ad(UF)201
Edward M. Freeman, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics	PP(UF)200

SCHOOL OF BUSINESS ADMINISTRATION

Russell A. Stevenson, Ph.D., Dean	VH127
John J. Reighard, M.A., C.P.A., Assistant Dean and Associate Professor of Accounting	VH104
J. Warren Stehman, Ph.D., Chairman of the Curriculum Committee and Professor of Economics and Finance	VH204
Bruce D. Mudgett, Ph.D., Chairman of the Graduate Committee and Professor of Economics	VH320
Harry J. Ostlund, B.A., Chairman of the Students' Work Committee and Assistant Professor of Accounting	VH104

DIRECTORY OF DEPARTMENTAL OFFICES

Administration (Educational) 202,224Bu
Agricultural Biochemistry 214SnH(UF)
Agricultural Economics 303aHH(UF)
Agricultural Education 205Hr(UF)
Agricultural Engineering 201En(UF)
Agronomy and Plant Genetics 102Ag(UF)
Animal and Poultry Husbandry 8LsPav(UF)
Anthropology 108WeH
Architecture 315E
Art Education 201J
Astronomy 359Ph
Bacteriology 228MH
Botany 209Bo
Business Administration 127VH
Center for Continuation Study CCS
Chemistry 127C
Child Welfare 101bPt
Classics 118F
Clinical Psychology 112Psy
Commercial Education 102UHS
Dairy Husbandry 207HH(UF)
Drawing and Descriptive Geometry 208E
Economics 127VH
Educational Administration 224Bu
Educational Psychology 302Psy
Educational Sociology 222Bu
Elementary Education 216,220Bu
English 219F
Entomology and Economic Zoology 300Ad(UF)
Fine Arts 101J
Forestry 205GH(UF)
Geography 101aBu
Geology and Mineralogy 108P
German 210F
Greek 118F
History 102Bu
History of Education 206,226Bu
Home Economics 215HE(UF)
Home Economics Education 215HE(UF)
Horticulture 111Hr(UF)
How To Study 108Psy
Human Anatomy 201 IA
Industrial Education 222Bu
Journalism 11P
Latin 118F
Library Methods 107Lib
Mathematics 119F
Methods and Directed Teaching 105UHS,220,206Bu
Military Science and Tactics 108A
Music 107Mu
Music Education 107Mu
Natural Science (College of Education) 15UHS
Naval Science and Tactics N
Nursery School and Kindergarten Education 100CWI
Nursing Education 125MeS
Orientation 26F
Philosophy 323F
Physical Education for Men 208CH
Physical Education for Women 101WGm
Physics 147Ph
Physiology 306MH
Plant Pathology and Botany 200PP(UF)
Political Science 203Bu
Preventive Medicine and Public Health 121MeS
Professional Education of Teachers 216,220Bu
Psychology 112Psy
Public Health Nursing HS
Publications and Rural Journalism 113Ad(UF)
Registrar's Office, University Farm 203dAd(UF)
Rhetoric 309En(UF)
Romance Languages 200dF
Rural Sociology 202OD(UF)
Scandinavian 122F
School Health Work HS
Secondary Education 218Bu
Social Studies (College of Education) 226Bu
Sociology and Social Work 108J
Soils 100aSo(UF)
Speech 309aF
Supervision (College of Education) 218,220Bu, 105UHS
Teachers of Subnormal Children 358Psy
University Testing Bureau 101EdH
Veterinary Medicine 119Ve(UF)
Zoology 308Z

EXPLANATIONS

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 letter (f, fall; w, winter; s, spring; su, summer).

Examples:

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.

Junior College courses in the College of Science, Literature, and the Arts (primarily for freshmen and sophomores) are numbered from 1 to 49. Senior College courses in the College of Science, Literature, and the Arts 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. This system is not uniformly followed by departments in other colleges than Science, Literature, and the Arts.

Statement of credits.—The number of credits stated for two- and three-quarter courses is the number for the entire course, not the number for each quarter.

OTHER ABBREVIATIONS AND SYMBOLS

I, II, III, etc.	Main campus, 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). 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.
Aud.	Auditorium.
Cred.	Credits.
Lab.	Laboratory.
Lect.	Lecture.
MTWThFS	Monday, Tuesday, etc.
Prereq.	Prerequisite.
Rec.	Recitation.
Sec.	Section.

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

‡ There is a fee (amount to be specified) for this course.

A parenthetical statement after the title of each course gives the following information: the number of credits the course carries, the classes to whom it is open, and the courses prerequisite to it. *Abbreviated statement:* (5 cred.; jr., sr.; prereq. 6). *Expanded statement:* This course carries five credits, is open to juniors and seniors only, and has for a prerequisite, Course 6 in the same department.

Buildings

A, Armory
Ad, Administration, University Farm
Adm, Administration
Ag, Agronomy Bldg., University Farm
BB, Bull Barn, University Farm
BCB, Beef Cattle Barn, University Farm

BFH, Botany Field House, University Farm
Bo, Botany
BoG, Botany Greenhouse
Bot, Botany, University Farm
Bu, Burton Hall
C, Chemistry Bldg.
CCS, Center for Continuation Study
CGD, College Girls' Dormitory, University Farm
CH, Cooke Hall
CS, Carpenter Shop, University Farm
CSP, Cold Storage Plant, University Farm
CWI, Child Welfare Institute
DCB, Dairy Cattle Barn, University Farm
DeH, Dexter Hall, University Farm
DH, Dining Hall, University Farm
DHD, Dining Hall Dormitory, University Farm
E, Main Engineering
EdH, Eddy Hall
EE, Electrical Engineering
En, Engineering Bldg., University Farm
Ex, Experimental Engineering
F, Folwell Hall
FCFH, Farm Crops Field House, University Farm
FdH, Field House
G, Greenhouse (13th and University Ave. S.E.)
GH, Green Hall, University Farm
Gy, Gymnasium, University Farm
Hospitals
  CI, Cancer Institute
  EH, Eustis Hospital
  EMH, Elliot Memorial Hospital
  HS, Health Service
  PW, Psychiatric Ward
  TM, Todd Memorial Hospital
  UD, University Dispensary
HB, Horse Barn, University Farm
HE, Home Economics, University Farm
HH, Haecker Hall, University Farm
HL, Hydraulics Laboratory, Hennepin Island
HMH, Home Management Houses, University Farm
HP, Heating Plant
Hr, Horticulture, University Farm
HS, Health Service, University Farm
IA, Institute of Anatomy
J, Jones Hall
Jr, Journalism
L, Law Bldg.
Lib, Library Bldg.
LsPav, Livestock Pavilion, University Farm
M, Mines Bldg.
MB, Music Bldg., University Farm
ME, Mechanical Engineering
MeS, Medical Sciences
MEx, Mines Experiment Station
MH, Millard Hall
MiU, Minnesota Union
MS, Machinery Shop, University Farm
MtH, Meat House, University Farm
Mu, Music Bldg.
NMA, Northrop Memorial Auditorium
O, Observatory
OD, Old Dairy, University Farm
OSL, Oak Street Laboratories
P, Pillsbury Hall
Pe, Pendergast Hall, University Farm
PG, Poultry Group, University Farm
Ph, Physics
PH, Power House, University Farm
Phm, Pharmacy
PiH, Pioneer Hall
PoH, Powell Hall
Psy, Psychology
Pt, Pattee Hall
S, Stadium
SaH, Sanford Hall
SB, Swine Barn, University Farm
SBH, State Board of Health
SGD, School Girls' Dormitory, University Farm
SH, Seed House, University Farm
ShH, Shevlin Hall
SnH, Snyder Hall, University Farm
So, Soils, University Farm
SpB, Sheep Barn, University Farm
SS, Storehouse and Shops
St, Stock Pavilion, University Farm
TRL, Technological Research Laboratory
UHS, University High School
VB, Veterinary Barn, University Farm
Ve, Veterinary, University Farm
VH, Vincent Hall
WeH, Wesbrook Hall
WGm, Women's Gymnasium
WH, Women's Hall, University Farm
Z, Zoology Bldg.

LIBRARY INSTRUCTION

Library Methods 1 is not a part of the professional curriculum of the Division of Library Instruction. Library Methods 51 to 126 are professional courses open only to senior students or graduates (except for a minor in the College of Education). A full four-year course of preparation instead of three is advised wherever practicable. The completion of a full year in Library Methods is accepted for graduation 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 on approval by the dean of the college concerned and the director of the Division of Library Instruction.

The fees for Library Methods (51-126) are $3 per credit hour or $40 per quarter ($3.50 per credit hour or $50 per quarter for nonresidents). Students with programs in other colleges or divisions (except those registered in Library Methods 1), must pay the special fee for all library instruction courses taken.

A course for hospital library training will also be given in the spring quarter. It will include 12 credit hours of class work, followed by six weeks of practice, or internship, in an approved hospital library. Requirements for admission are the satisfactory completion of at least two quarters of work in an approved library school and courses in Essentials of Medicine for Social Workers (Soc. 136w, 3 cred.) and Abnormal Psychology (Psy. 144f-145w, 6 cred.) or equivalent approved courses. Candidates for admission to this course should apply for a bulletin giving more detailed information regarding the course.

No.	Title	Hour	Day	Bldg.	Instructor
1f,w,s*	Use of Books and Libraries (2 cred.; fr., soph. only; no prereq.)				
	Sec. 1	II	MW	3Lib	Mr. Russell, Miss Moen
	2	IV	MW	3Lib	Mr. Shove, Miss Bennett
	3	VI	MW	5Lib	Miss Davenport
	Professional Courses				
51f	Bibliography (3 cred.; no prereq.)	III	MWF	5Lib	Mr. Shove
52f§	Cataloging (3 cred.; no prereq.)				
	Sec. 1 (Ed. students)	I	MWF	5Lib	Miss Hutchinson
	2	IV	MWF	5Lib	Miss Hutchinson
53w	Advanced Cataloging (3 cred.; prereq. 52)	IV	MWF	5Lib	Miss Hutchinson
54f§	Classification (3 cred.; no prereq.)	II	TThS	5Lib	Miss Hutchinson
55w	Advanced Classification (3 cred.; prereq. 54)	II	TThS	5Lib	Miss Hutchinson
57s	Secondary School Libraries (3 cred.; prereq. 9 cred. in library methods)	I	TThS	5Lib	Miss Greer
58s	Public Library Administration (3 cred.; prereq. 9 cred. in library methods)	II	TThS	5Lib	Mr. Vitz
60f	Library Binding (1 cred.; no prereq.)	III	T	5Lib	Mr. Walter
61f,w,s§	Library Practice (3 to 4½ cred.; prereq. 15 cred. in library methods)	Ar	Ar	Ar	Mr. Walter
62w§	Reference (3 cred.; no prereq.)	III	MWF	5Lib	Miss Hutchinson
63s	Advanced Reference (3 cred.; prereq. 62)	III	MWF	5Lib	Miss Hutchinson

* For students in the College of Science, Literature, and the Arts. Others may obtain a special card from the Junior College office.

§ Required of all candidates for a degree in library methods.

No.	Title	Hour	Day	Bldg.	Instructor
64s	Selection of Books for Adolescents (3 cred.; prereq. 9 cred. in library methods)	II	MWF	5Lib	Miss McGregor
67w	Library Printing (1 cred.; no prereq.)	III	T	5Lib	Mr. Walter
68s	Circulation Work (1 cred.; prereq. 9 cred. in library methods)	III	T	5Lib	Mr. Walter
69f	Current Library Problems (3 cred.; prereq. 9 cred. in library methods or with Lib. Meth. 51, 52, 54)	II	MWF	5Lib	Mr. Walter
70w	Current Library Problems (3 cred.; prereq. 69)	II	MWF	5Lib	Mr. Walter
71w	Library Work with Children (3 cred.; prereq. 9 cred. in library methods or 6 cred. and one 3-cred. course in library training with 71)	I	MWF	5Lib	Miss McGregor
72s	Library Work with Children (3 cred.; prereq. 71)	I	MWF	5Lib	Miss McGregor
73f	Selection of Books for Adults (2 cred.; no prereq.)	III	ThS	5Lib	Miss Hutchinson
74w	Selection of Books for Adults (2 cred.; prereq. 73)	III	ThS	5Lib	Miss Hutchinson
75s	Selection of Books for Adults (2 cred.; prereq. 73, 74)	III	ThS	5Lib	Miss Hutchinson
76s	Library Service in Hospitals (3 cred.)	I	TThS	3Lib	Miss Jones and others
77s	Book Selection for Hospital Patients (3 cred.)	IV	MWF	3Lib	Miss Methven and others
78s	Reading and the Mental Patient (2 cred.)	III	TS	3Lib	Miss Jones and others
79s	Medical Reference Work (3 cred.)	II	MWF	314Lib	Mr. Walter and others
80s*	Hospital Library Practice—A six-week internship in approved hospitals (4 cred.)				Miss Methven
126s	Subject Bibliography (Prereq. sr. or grad. standing and bibliographical or research training or experience)	I	MWF	3Lib	Mr. Russell

* This practice will be a six-week internship in approved hospitals. The specific arrangements will be made by Miss Methven after the close of the class work early in June. This internship is required of all candidates for degrees or certificates.

MILITARY SCIENCE AND TACTICS

(Coast Artillery Unit *Only*)

No.	Title	Hour	Day	Bldg.	Instructor
	Basic Courses				
1f*	First Year Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	VIII	MWTh	A	Ar
2w*	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	IX	MWF	A	Ar
3s*	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	I	M	A	Ar
		V, IX	T	A	Ar
	2	I, V, IX	T	A	Ar
	3	V, VII, IX	T	A	Ar
4f*	Second Year Basic Course (1 cred.; soph.; prereq. 1, 2, 3, higher algebra and plane trigonometry)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	VIII	MWTh	A	Ar
5w*	Second Year Basic Course (1 cred.; soph.; prereq. 4f)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	IX	MWF	A	Ar
6s*	Second Year Basic Course (1 cred.; soph.; prereq. same as for 4f)				
	Sec. 1	I, V, IX	T	A	Ar
	2	I	M	A	Ar
		V, IX	T	A	Ar
	3	V, VII, IX	T	A	Ar

NOTE.—Students may register for Courses 1 to 6 and substitute playing in the band for regular military work, with the understanding that this choice renders them ineligible for the Advanced Courses. Premedical students should take First Year Basic Course in C.A.C. unit; Second Year Basic Course and Advanced Courses in Medical Unit are given in the Medical School.

	Advanced Courses				
151f-152w*	First Year Advanced Course (3 cred. per qtr.; prereq. 4, 5, 6) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VI-VII	M	A	Ar
	2	VI-VII	W	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
153s*	First Year Advanced Course (3 cred.; prereq. 4, 5, 6) Total of five hours to be taken as follows:				
	Sec. 1	V, IX	T	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar

* Offered on the Main campus.

No.	Title	Hour	Day	Bldg.	Instructor
154f*	Second Year Advanced Course (3 cred.; prereq. 151-152, 153) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Ar
	2	VIII-IX	F	A	Ar
		One of the three-hour sections:			
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
155w*	Second Year Advanced Course (3 cred.; prereq. 54) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Ar
	2	VIII-IX	F	A	Ar
		One of the three-hour sections:			
	Sec. 1	III	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	IV	TTh	A	Ar
		II	S	A	Ar
156s*	Second Year Advanced Course (3 cred.; prereq. 54-55) Total of five hours to be taken as follows:				
	Sec. 1	V, IX	T		
		One of the three-hour sections:			
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar

NOTE.—The general rule regarding credit for the Advanced Courses is: "Three credits per quarter will be allowed for work in the advanced R.O.T.C. courses with a maximum of 18 quarter credits for the two-year course.

* Offered on the Main campus.

NAVAL SCIENCE AND TACTICS

This department is a unit of the Naval Reserve Officers' Training Corps established by the Act of Congress approved March 4, 1925. For further information see the special bulletin announcing courses in naval science and tactics for the year 1939-40. The courses will be given for those who intend to complete the four years of training for a commission in the Naval Reserve. Only students signifying such a purpose will be accepted.

PHYSICAL EDUCATION FOR MEN

Major advisers.—L. F. Keller, C. L. Nordly, R. A. Piper, E. L. Haislet, D. C. Bartelma.

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 during present and future years for more enjoyable living. The status of these courses in the various colleges is as follows:

1. College of Education—(all except majors and minors in physical education) required with credit.
2. General College—required.
3. The Institute of Technology—elective with credit if taken for three quarters.
4. College of Agriculture, Forestry, and Home Economics—elective with credit if taken for three quarters.
5. University College—elective with credit.
6. All other colleges—elective without credit.

A towel and locker fee of $1.25 per quarter is charged all students using physical education facilities for activity.

The University furnishes uniforms to students for class work or recreational activity for $1 per quarter.

The facilities of the Department of Physical Education, including the golf course, tennis courts, gymnasiums, 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.

SPORTS EDUCATION

Supervisor of Sports Education.—R. A. Piper.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s	Sports Education (3 cred.) All freshmen in General College and College of Education:				
		III	MWF	CH Gym	Mr. Bartelma
		IV	MWF		Mr. Beise,
	Fall: Touchball, Swimming, Volleyball				Mr. Boyce,
	Winter: Boxing, Wrestling, Basketball, and Golf				Mr. Brain,
	Spring: Soft Ball, Tennis, Handball, and Squash				Mr. Otterness,
					Mr. Thorpe
1f,2w,3s	Sports Education. Elective for sophomores in the General College and any men in all other colleges:				
	Beginning Swimming	II	MWF		Mr. Thorpe,
	Intermediate Swimming	II	TThS		Mr. Boyce
	Advanced Swimming	III	MWF	(w,s)	
	Lifesaving	III	TThS		
	Miscellaneous Swimming	VI	MWF		
	Boxing	VIII	MWF	(f,w)	Mr. Haislet
		IX	MWF		
	Badminton	VI	MWF	(w)	Mr. Brain
	Tennis	VII	MWF	(s)	Mr. Brain
	Individual Physical Education Activities (by permission of instructor only)	III	MWF	246S	Mr. Osell
		IV	MWF		
		VIII	MWF	(f,w)	
		VII	MWF	(s)	

Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

Courses in Major and Minor Curricula in Physical Education for Men

No.	Title	Hour	Day	Bldg.	Instructor
4Af,4Bw,4Cs	Fundamentals of Athletic Sports (3 cred.; no prereq.) (Formerly Courses 37, 38)	VII-VIII	TTh	215CH	Mr. MacMillan, Mr. Beise, Mr. Otterness
5Af-5Bw-5Cs	Physical Education Activities (3 cred.; no prereq.) (Formerly Course A-B-C)	III-IV	T	CH	Mr. Piper
		III	Th		Mr. Bartelma, Mr. Beise
6Af,6Bw,6Cs	Intramural Sports (3 cred.; all; no prereq.) (Formerly Courses 10, 11, 12)	VII(f,w)	MWF	215CH	Mr. Keller
		I(s)	MWF	215CH	Mr. Beise, Mr. Thorpe
7Af-7Bw-7Cs	Physical Education Activities (3 cred.; soph., jr., sr.) (Formerly Course 19-20-21)	II-III	TTh	CH Gym	Mr. Piper, Mr. Bartelma, Mr. Beise
8s	Dual Spring Sports (1 cred.; all; no prereq.)	VII	MWF	215CH	Mr. Smith, Mr. Brain
9s	Rhythms (1 cred.; jr., sr.)	II	TThS	Ar	Mr. Piper
50s	Human Anatomy (4 cred.; soph.; prereq. Zool. 1-2-3 or G.C. 101, 102-103)	III-IV	MWF	Ar	Mr. Keys and others
51f	Mechanics of Movement (3 cred.; jr.; prereq. 50) (Formerly Course 22-23)	II	MWF	206CH	Mr. Osell
53f‡,54w‡,55s‡	Methods and Materials in Physical Education (6 cred.; jr.; prereq. 4 cred. from 5A-B-C, 6A,B,C; and 7A-B-C, 8, 9) (Formerly Course 7-8-9 and 54-55)				
	Lect.	V(f,w)	Th	206CH	Mr. Keller, Mr. Bartelma
	Lab.	Ar			
	Lect.	I(s)	M		
	Lab.	Ar			
56w	Nature and Function of Play (2 cred.; sr., grad.; prereq. Psy. 1, 2 or equiv.)	IX-X	M		Mr. Haislet
60s	Prevention and Care of Injuries (2 cred.; jr.)	III	TThS	206CH	Mr. Stein
61f	History of Physical Education (2 cred.; sr.)	I	MWF	206CH	Mr. Keller
63s	Organization and Administration of Physical Education (3 cred.; sr.; prereq. 53, 54, 55)	III	MWF	206CH	Mr. Piper
66Af,66Bw	Methods and Techniques of Officiating (2 cred.; sr.; prereq. 4A,B,C, and 6A,B,C)				
	Lect.	VIII	M	206CH	Mr. Nordly,
	Lab.	Ar			Mr. Piper, Mr. Smith
67s	Coaching of Athletic Sports (Football) (2 cred.; sr.; prereq. 4B and one year experience on Minnesota squad)	II	TThS	214CH	Mr. Bierman
68f	Coaching of Athletic Sports (Basketball) (2 cred.; sr.; prereq. 4A)	VI	MWF	214CH	Mr. MacMillan

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

No.	Title	Hour	Day	Bldg.	Instructor
69s	Coaching of Athletic Sports (Track) (2 cred.; sr.; prereq. 4C)	VII	MW and 2 hrs ar	214CH	Mr. Kelly, Mr. Otterness
72w	Coaching of Athletic Sports (Baseball) (2 cred.; sr.; prereq. permission of instructor)	VI	MWF	214CH	Mr. McCormick
73f‡,74w‡,75s‡	Student Teaching (6 cred.; sr.; prereq. 4A,B,C; 5A,B,C; 6A,B,C; 7A,B,C; 53, 54, 55)	V	M and 5 hr ar	214CH	Mr. Keller, Mr. Curtis
78w	Elements of Scout Leadership (2 cred.; no prereq.)	VI	TTh	206CH	Mr. Osell
79s	Camp Craft and Camp Administration (2 cred.; no prereq.)				
	Lect.	VI	T	206CH	Mr. Osell
	Lab.	VI-VII	Th		
101Ew§	Principles of Physical Education (3 cred.; sr., grad.; prereq. 53, 54, 55) (Formerly Course 62)	I	MWF	206CH	Mr. Keller, Mr. Haislet
103Es§	Physiological Hygiene (3 cred.; sr., grad.; prereq. 50, 51, Physiol. 50, 51 or equiv.) (Formerly Courses 58 and 59)	VI	MWF	206CH	Dr. Hauser, Mr. Keys, Mr. Osell
133Ef§	Special Administrative Problems in Physical Education (3 cred.; sr., grad.; prereq. 63 or equiv.)	I-II-III	S	206CH	Mr. Nordly
134Ew§	The Curriculum in Physical Education (3 cred.; sr., grad.; prereq. 63, 101E or equiv.)	I-II-III	S	206CH	Mr. Nordly
135Es§	Tests and Measurements in Physical Education (3 cred.; sr., grad.; prereq. 10 hrs. in phys. ed. and Ed. Psy. 60 or equiv.)	I-II-III	S	206CH	Mr. Keller
136Ef§	Leadership in Recreation (3 cred.; sr., grad.; prereq. 56 or equiv. and 10 hrs. in ed. or permission of instructor or equiv.)	IX-X	T	206CH	Mr. Haislet
		IX	Th		
137Es§	Recent Literature and Research in Physical Education (3 cred.; grad.; permission of instructor)	IX-X	T	206CH	Mr. Nordly
		X	Th		
237E	Problems in Physical Education (3-6 cred.; grad.; prereq. 137E and Ed. 208; ar.)				Mr. Nordly

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

§ The designation "E" after a course number over 100 signifies that the course is of graduate level in the College of Education but does not carry credit for Plans A and B in the Graduate School.

PHYSICAL EDUCATION FOR WOMEN

Major adviser.—Professor J. Anna Norris.

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.

The status of these courses in the various colleges for which these courses are offered is as follows:

1. *College of Education.*—Requirement: 6 quarters, including Phys. Ed. 7§. Lectures in Physical Education and Health, a total of five credits, i.e., 1 credit each for three freshman quarters and ⅔ credit each for three sophomore quarters. For the specific activity requirement call at the main office, Women's Gymnasium.
2. *General College.*—Requirement: 6 quarters, including Phys. Ed. 7§, Lectures in Physical Education and Health. For the specific activity requirement call at the main office, Women's Gymnasium.
3. *College of Agriculture, Forestry, and Home Economics.*—Requirement: 3 quarters chosen from Phys. Ed. 1, 2, 3, 4, 5, 6, and 8, one credit each per quarter; Phys. Ed. 7, two credits per quarter. For the specific activity requirement call at the main office, Women's Gymnasium. This requirement may be completed any time during the period of residence.
4. *School of Dentistry; Dental Hygienists.*—Requirement: 3 quarters of activity plus Phys. Ed. 7, Lectures in Physical Education and Health. For the specific activity requirement call at the main office, Women's Gymnasium.
5. *All other colleges.*—Elective without credit.

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. For methods and practice teaching courses a fee of $1 per credit is charged as indicated in the footnote.

The facilities of the Department of Physical Education for Women, including an 18-hole golf course, tennis courts, three gymnasia, two swimming pools, squash court, large indoor sports room, outdoor playing fields, are available for use by all women students.

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¶ (fall, spring)				
	Sec. 1	II	TTh	51WGm	Ar
	2	IV	MW	51WGm	Ar
	3	VII	MW	51WGm	Ar
	4	VIII	TTh	51WGm	Ar
	5	III	TTh	51WGm	Ar
	6	VI	MW	51WGm	Ar

* A physical education fee of $1.75 per quarter is charged for any activity under this unit.

§ This course must be taken during the first year in residence. If exempt, College of Education students must substitute an activity course; General College students, if exempt, are required to take only five activity courses.

¶ For students with no experience in swimming.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s	General Course in Physical Education—Continued				
	Swimming, Beginning§ (winter)				
	Sec. 1	IV	MW	51WGm	Ar
	2	VI	MW	51WGm	Ar
	Swimming, Advanced Beginning¶ (winter)				
	Sec. 1	II	TTh	51WGm	Ar
	2	III	TTh	51WGm	Ar
	3	VII	MW	51WGm	Ar
	4	VIII	TTh	51WGm	Ar
	Swimming, Intermediate				
	Sec. 1 (fall, winter)	II	TTh	58WGm	Ar
	2 (spring)	III	TTh	58WGm	Ar
	3 (fall, winter, spring)	IV	MW	58WGm	Ar
	4 (fall, winter, spring)	VIII	MW	51WGm	Ar
	Swimming, Advanced (fall, winter, spring)				
	Sec. 1	VI	MW	58WGm	Ar
	2	VIII	MW	58WGm	Ar
	3	VIII	TTh	58WGm	Ar
	Diving, Advanced (spring) Class limited to 15	III	MW	58WGm	Ar
	Lifesaving (spring)				
	Sec. 1	VI	TTh	58WGm	Ar
	2	IX	MW	58WGm	Ar
	Recreational Swimming and Water Games (spring)	VII	TTh	51WGm	Ar
	*The Dance**				
	Folk Dancing (fall, winter)	II	MW	151WGm	Ar
	Recreational Rhythms (winter, spring)—Basic rhythmic training through recreational rhythmic activities.	VI	MW	151WGm	Ar
	Modern Dance, Elementary				
	Sec. 1(fall, winter, spring)	VII	TTh	151WGm	Miss Gardner
	2 (fall)	VI	MW	151WGm	Miss Gardner
	Modern Dance, Advanced (fall, winter, spring)	IV	MW	151WGm	Miss Gardner
	Social Dancing (fall)	VIII	TTh	151WGm	Ar
	Tap Dancing, Elementary				
	Sec. 1 (fall)	III	MW	151WGm	Ar
	2 (winter)	III	TTh	151WGm	Ar
	Tap Dancing, Intermediate (winter)	VIII	TTh	151WGm	Ar
	*Individual Sports and Activities**				
	Archery, Elementary				
	Sec. 1 (spring)	I	MW	60WGm	Ar
	2 (fall, winter)	II	MW	60WGm	Ar
	3 (fall, winter, spring)	VI	TTh	60WGm	Ar
	4 (fall)	VI	MW	60WGm	Ar
	5 (winter)	VIII	MW	60WGm	Ar
	6 (spring)	III	TTh	60WGm	Ar
	7 (spring)	IV	MW	60WGm	Ar
	8 (fall)	I	TTh	60WGm	Ar

* A physical education fee of $1.75 per quarter is charged for any activity under this unit.
§ For students with no experience in swimming.
¶ For students with some experience in swimming.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s	General Course in Physical Education—Continued				
	Archery, Intermediate				
	Sec. 1 (fall, winter)	III	MW	60WGm	Ar
	2 (fall, spring)	VIII	MW	60WGm	Ar
	3 (spring)	II	MW	60WGm	Ar
	4 (winter)	I	TTh	60WGm	Ar
	5 (fall)	I	MW	60WGm	Ar
	Badminton				
	Sec. 1 (fall)	VIII	MW	153WGm	Ar
	2 (winter)	I	MW	153WGm	Ar
	3 (winter)	VI	MW	153WGm	Ar
	4 (spring)	II	MW	153WGm	Ar
	Golf, Elementary§				
	Sec. 1 (winter)	III	TTh	60WGm	Ar
	2 (spring)	I	TTh	60WGm	Ar
	3 (spring)	III	MW	60WGm	Ar
	4 (spring)	VIII	TTh	60WGm	Ar
	Golf, Intermediate§				
	Sec. 1 (spring)	II	TTh	60WGm	Ar
	2 (spring)	VI	MW	60WGm	Ar
	Horseback Riding (See non-fee courses)				
	Individual Body Building				
	Sec. 1 (fall)	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, and racing. Classes meet at the Hippodrome.				
	Sec. 1	VII	WF	Ar	Ar
	2	VIII	WF	Ar	Ar
	Tennis, Elementary‡‡ (spring)				
	Sec. 1	I	MW	151WGm	Ar
	2	I	TTh	151WGm	Ar
	3	III	TTh	151WGm	Ar
	4	IV	MW	151WGm	Ar
	5	VI	MW	151WGm	Ar
	Tennis, Intermediate‡‡ (spring)				
	Sec. 1	II	TTh	151WGm	Ar
	2	III	MW	151WGm	Ar
	3	VII	MW	151WGm	Ar
	Tournament Tennis‡‡ (spring)	VIII	TTh	151WGm	Ar

*Team Sports and Activities**

Baseball (spring)	III	TTh	151WGm	Ar
Basketball, Elementary (winter)				
Sec. 1	III	TTh	151WGm	Ar
2	VI	MW	60WGm	Ar
3	IV	MW	60WGm	Ar
Basketball, Intermediate (winter)				
Sec. 1	II	TTh	60WGm	Ar
2	VIII	TTh	60WGm	Ar
Games and Mixers (spring)	VIII	TTh	151WGm	Ar
Group Body Building (winter)—Exercises for flexibility, grace, and ease of movement.	III	MW	151WGm	Ar

* A physical education fee of $1.75 per quarter is charged for any activity under this unit.
‡‡ Students taking tennis must pay $1 for a tennis permit.
§ Students must supply their own equipment.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s	General Course in Physical Education—Continued				
	Posture and Daily Life Skills				
	Sec. 1 (fall)	I	MW	153WGm	Ar
	2 (fall)	III	TTh	153WGm	Ar
	3 (fall)	IV	MW	153WGm	Ar
	4 (winter)	II	MW	153WGm	Ar
	Introductory Course in Sport Skills				
	Sec. 1 (fall)	III	TTh	60WGm	Ar
	2 (fall, winter)	IV	MW	60WGm	Ar
	3 (winter)	I	MW	60WGm	Ar
	Soccer (fall)	VI	MW	151WGm	Ar
	Sports and Dance Appreciation§ (winter)—Movies, demonstrations, talks by experts on sports and the dance.	IV	MW	201WGm	Ar
	Volleyball				
	Sec. 1 (fall, winter, spring)	II	MW	153WGm	Ar
	2 (fall)	IV	MW	153WGm	Ar

General Courses for Which No Physical Education Fee Is Charged

7f,w,s	Lectures in Physical Education and Health¶				
	Sec. 1 (fall, winter, spring)	I	MW	201WGm	Ar
	2 (fall)	II	TTh	201WGm	Ar
	3 (fall, winter)	VI	MW	201WGm	Ar
8s‡‡	Horseback Riding				
	Sec. 1	VIII	TTh	Ar	Miss Starr
	2	IX	TTh	Ar	Miss Starr
54s	Camp Leadership (See Course in Major Curriculum)				

Recreational Activities for Which No Registration Is Required

IX MTWTh 151WGm

Fall	*Winter*	*Spring*
Field Hockey	Basketball	Baseball
Horseback Riding	Swimming	Horseback Riding
Volleyball	Winter Sports	Tennis
Swimming	Tap Dancing	Golf
Archery	Badminton	Badminton
Badminton	Archery	Swimming
Tap Dancing	Rifle Marksmanship	Archery
Rifle Marksmanship		

Courses in Major and Minor Curricula in Physical Education for Women

Open only to students in the College of Education, with the exception of Courses 23A-B, 46A-B-C, 54, and 66A-B-C.

21Af-Bw-Cs*	Freshman Team Sports (1½ cred.; no prereq.)				
		VIII	MW	151WGm	Ar
22Af-Bw-Cs*‡	Individual Sports and Fundamentals of Movement (3 cred.; no prereq.)				
		VIII (fall)	TTh	60WGm	Ar
		III (fall)	S	153WGm	Ar
		I (winter)	TThS	153WGm	Ar
		IV (spring)	T	151WGm	Ar
		II, III (spring)	S	151WGm	Ar

* A physical education fee of $1.75 per quarter is charged for this course.

‡ Students must supply their own golf equipment and must pay $1 for tennis permit.

‡‡ For horseback riding students will pay about $1 per lesson. Attendance at class hours is required for credit. Class meetings are one hour. Groups will be arranged according to riding ability.

§ Open to students with permission of department.

¶ This course must be taken during the first year in residence. If exempt, College of Education student must substitute an activity course; General College students, if exempt, are required to take only five activity courses.

No.	Title	Hour	Day	Bldg.	Instructor
23Aw-Bs*	Elementary Folk Dances and Games (1 cred.; no prereq.)				
		II	TTh	151WGm	Miss Kissock
24Af-Bw*	Danish Gymnastics (1 cred.; no prereq.)				
		I (fall)	TTh	153WGm	Ar
		VIII (winter)	TTh	153WGm	Ar
25s	First Aid (1 cred.; no prereq.)				
		VIII	TTh	153AWGm	Miss Mee
41Af-Bw-Cs*	Sophomore Team Sports (1½ cred.; prereq. 21A-B-C)				
		VIII	MW	151WGm	Ar
42Af-Bs*‡‡‡	Sophomore Individual Sports (1 cred.; prereq. 22A-C)				
		II (fall)	TThS	60WGm	Ar
		I (spring)	TThS	151WGm	Ar
43s*	Advanced Folk Dancing (1 cred.; prereq. 23A-B)				
		II	TThS	151WGm	Ar
44Af-Bw*	Modern Swedish Gymnastics (1 cred.; prereq. 22B, 24A-B)				
		I	MW	153WGm	Ar
45Af-Bw*	Sophomore Major Swimming (1 cred.; prereq. elem. swim. test)				
		II	MW	58WGm	Miss Starr
46Af-Bw-Cs*	Modern Dance, Elementary (1½ cred.; no prereq.)				
		VII	MW	151WGm	Miss Gardner
47Af-Bw*	Tumbling, Stunts and Apparatus (1 cred.; no prereq.)				
		I	TTh	151WGm	Ar
50s‡‡	General Anatomy (4 cred.; soph.; prereq. Zool. 1-2-3)				
		III, IV	MWF	312IA	Miss Braun
51s‡‡	Special Anatomy and Mechanics of Movement (4 cred.; soph.; prereq. 50 and high school physics)				
		VI, VII, VIII, IX	TTh	312IA	Miss Braun
60s	Principles of Play (2 cred.; prereq. 23A-B and Psy. 1-2)				
		III	MW	201WGm	Miss Kissock
61Af-Bw-Cs*‡	Technique of Teaching Sports (3 cred.; jr.; prereq. 41A-B-C, 42A-B)				
		III (fall)	MWF	151WGm	Miss Snell
		VIII (winter)	MWF	151WGm	Miss Snell
		VIII (spring)	MWF	151WGm	Miss Snell
62s	Physical Examination (2 cred.; jr.; prereq. 51)				
		VI	MWF	153A, 201WGm	Miss Mee
63w*‡	Technique of Teaching Folk Dancing (1 cred.; jr.; prereq. 43)				
		II	TThS	153WGm	Miss Baker
64w*‡	Technique of Teaching Group Gymnastics (1 cred.; jr.; prereq. 24A-B, 44A-B, 51)				
		IV	TS	153WGm	Ar
65s*‡	Integration of Special Methods (2 cred.; jr.; prereq. minimum of 2 courses in special techniques)				
		III	TThF	153WGm	Miss Baker
		IV	T		
66Af-Bw-Cs*	Modern Dance, Intermediate (1½ cred.; jr.; prereq. 46A-B-C)				
		I (begins at 8:00)	F	151WGm	Miss Baker
67Af-Bw*‡	Technique of Teaching Swimming (2 cred.; jr.; prereq. 45A-B)				
		III	TThS	58WGm	Miss Starr
68s*§	Lifesaving and Water Front Safety (1 cred.; jr.; prereq. 67A-B)				
		II	MWF	58WGm	Miss Starr
71f*	Applied Physiology (3 cred.; sr.; prereq. 51 and Physiol. 51)				
	Lect.	I	WF	201WGm	Miss Braun
	Lab.	I, II, III	S	Ar	Miss Braun

* A physical education fee of $1.75 per quarter is charged for this course.
‡ A fee of $1 per credit is charged for this course.
‡‡ A fee of $2 is charged for Phys.Ed. 50 and 51 whether taken as a whole or as a part.
‡‡‡ Students must supply their own golf equipment and must pay $1 for tennis permit.
§ A lifesaving certificate is a prerequisite for practice teaching in swimming.

No.	Title	Hour	Day	Bldg.	Instructor
73Af-Bw*‡	Technique of Teaching Rhythm (1½ cred.; sr.; prereq. 66A-B-C) (1 cred. 73A, ½ 73B) (Formerly Courses 73 and 76)				
		IV (fall)	T	151WGm	Miss Baker
		II (fall)	F	151WGm	Miss Baker
		IV (winter)	T	151WGm	Miss Baker
		III (winter)	F	151WGm	Miss Baker
74Af-Bw	Advanced Fundamentals of Movement (1 cred.; sr.; prereq. 64)				
		II (fall)	TTh	153WGm	Miss Baker
		III (winter)	MW	153WGm	Miss Baker
80w	Principles of Rhythm (2 cred.; sr.; prereq. 66A-B-C)				
		II	WF	201WGm	Miss Baker
81f	Trends in Physical Education (2 cred.; sr.)				
		III	TTh	201WGm	Miss Kissock
82f	Principles of Physical Education (2 cred.; sr.; prereq. 65)				
		II	MW	201WGm	Miss Baker
83f	Health Education, Method and Content (3 cred.; sr.; prereq. 65, P.M.&P.H. 50)				
		III	MWF	201WGm	Miss Starr
84s	Problems in Physical Education (2 cred.; sr.; prereq. 82)				
		II	MW	201WGm	Miss Baker
85Af-Bw	Orthopedic and Remedial Gymnastics (3 cred.; sr.; prereq. 62)				
	Lect.	I (fall)	T	3WGm	Miss Mee
	Lab.	I (fall)	Th	153AWGm	Miss Mee
		VIII (fall)	M	153AWGm	Miss Mee
	Lect.	I (winter)	M	201WGm	Miss Mee
	Lab.	II (winter)	M	153AWGm	Miss Mee
90Af-Bw-Cs‡	Student Teaching (4 to 7 cred.; sr.; prereq. 60, 61A-B-C, 63, 64, 65, 67A-B, 73A-B)				
		Ar	Ar	Ar	Miss Baker
95Aw-Bs	Administration of Physical Education (3 cred.; sr.; prereq. 60, 81, 82, 83)				
		IV (winter)	WF	201WGm	Dr. Norris
		IV (spring)	W	201WGm	Dr. Norris
111Ef‡§	An Advanced Course in Methods of Teaching in Physical Education (3 cred.; sr., grad.; prereq. undergrad. methods courses, 60 and 82 or equiv.)				
		III, IV and 1 hr ar	S	3WGm	Dr. Norris, Miss Baker, Miss Snell, Miss Starr, Miss Mee
112Es§	Supervision of Physical Education (3 cred.; sr., grad.; prereq. teaching experience)				
		IX, X and 1 hr ar	T	3WGm	Miss Baker
113Ew§	Physical Education in the Elementary Schools (3 cred.; sr., grad.; prereq. 60 and 82 or equiv. and experience teaching elementary grade children)				
		IX, X and 1 hr ar	T	3WGm	Miss Baker
114Ew§	The Administration of the Health Education Program (3 cred.; sr., grad.; prereq. 83, P.M.&P.H. 50 or equiv.)				
		VIII, IX and 1 hr ar	W	201WGm	Miss Starr
115Ef§	Recent Literature and Research in Mechanics of Movement (3 cred.; sr., grad.; prereq. Physiol. 51, Phys. Ed. 71 or equiv.)				
		Ar	Ar	Ar	Miss Braun
221f-222w-223s	Seminar in Physical Education	Ar	Ar	201WGm	Dr. Norris, Miss Baker, Miss Kissock, Miss Snell, Miss Starr
	Elective Courses				
54s	Camp Leadership (2 cred.; no prereq.)				
		IV 1 hr. ar.	MWF	201WGm	Miss Starr
79s	Massage and Therapeutic Exercises (2 cred.; prereq. 85A-B)				
		I	TThS	153AWGm	Miss Mee

* A physical education fee of $1.75 per quarter is charged for this course.

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

§ The designation "E" after a course number over 100 signifies that the course is of graduate level in the College of Education but does not carry credit for Plans A and B in the Graduate School.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

The College of Science, Literature, and the Arts distinguishes between Junior College courses, intended primarily for freshmen and sophomores, and Senior College courses, intended primarily for juniors and seniors.

Senior College courses appear in the announcement as open to "juniors and seniors" or to "juniors, seniors, and graduates."

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 beneath the heading *Senior College Courses* in departmental statements in the Science, Literature, and the Arts section of this Combined Class Schedule Bulletin. Other Senior College courses are open to Junior College students only by special permission of the Students' Work Committee. The committee will usually grant such permission to students who have an average grade of at least C in all their work and in the prerequisite courses. 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.

ANATOMY

See Human Anatomy, page 61.

ANTHROPOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Wallis.

Major sequence in the College of Science, Literature, and the Arts.—At least twenty-seven credits selected from: Anthropology courses numbered above 100, Zoology 83, 170-171.

(Prerequisites: Course 41, with fifteen additional credits from either the social or biological sciences.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
41f	Introduction to Anthropology—Physical characteristics of the human races; fossil men; prehistory; primitive economic and industrial activities; religious life, social organization, and other phases of culture (5 cred.; soph., jr., sr.; prereq. 10 cred. in sci. or soc. sci.)	IV	MTWFS	301F	Mr. Mandelbaum
41w	Introduction to Anthropology (See 41f)	VI	MTWThF	206Pt	Mr. Wallis
41s	Introduction to Anthropology (See 41f)	VI	MTWThF	166Ph	Mr. Cline

Senior College Courses

Courses 53, 54, 56 are open to Junior College students who have a grade of at least C in Course 41. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement at the top of this page.

53 *Cultural Anthropology: Technology*—The arts and industries of primitive man (3 cred.; jr., sr.; prereq. 41) *(Not offered)*

54s Social Organization—An analysis and survey of forms of social life (3 cred.; jr., sr.; prereq. 41)

	I	MWF	6WeH	Mr. Wallis

No.	Title	Hour	Day	Bldg.	Instructor
56f	Primitive Science—The beliefs and knowledge of primitive man (3 cred.; jr., sr.; prereq. 41)	I	MWF	6WeH	Mr. Wallis
105f	Elements of Language—A survey of speech sounds followed by practice in phonetic recording. Analysis of phonetic patterns in language. Practical work in dictation of Chippewa, Dakota, Finnish, and other languages (3 cred.; jr., sr., grad.; prereq. 41 or 10 credits of any language)	II	MWF	6WeH	Mr. Mandelbaum
106w	European Prehistory (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Cline
110f	Physical Anthropology—Man's place in the animal kingdom. Comparison of man's structure with that of the anthropoid apes; types of prehistoric men; anthropometry (3 cred.; jr., sr., grad.; prereq. 41 or one course in human anat. or zool.)	III	MWF	6WeH	Mr. Wallis
111	*Advanced Physical Anthropology* (3 cred.; jr., sr., grad.; prereq. 110) *(Not offered)*				
115w	The American Indian—A survey of native cultures of the New World. Physical and cultural characteristics (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	6WeH	Mr. Wallis
116	*Indians of the Southwest* (3 cred.; jr., sr., grad.; prereq. 41) *(Not offered)*				
117f	Culture and Culture Areas—An analysis of culture; diffusion of culture traits; trait complexes (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	6WeH	Mr. Wallis
118f	Races and Cultures of Middle and South America (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Cline
119s	The Contact of Cultures—The impact of western civilization on native societies. The tenacity of culture patterns and the disintegration of aboriginal cultures. Case examples from North America, Africa, and Asia (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Mandelbaum
120s	Indians of the Plains—The aboriginal inhabitants of the prairies and plains. The tribes which lived between the Upper Mississippi and the Rockies, from the forests of western Canada to Texas (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Mandelbaum
122f-123w-124s	Problems in Anthropology (Cred. ar.; jr., sr., grad.; prereq. three courses and permission of instructor; for honors course students)	Ar	Ar	Ar	Mr. Wallis, Mr. Cline, Mr. Mandelbaum
131w-132s*	Races and Cultures of Arabia, Egypt, and North Africa—Course 131: Pre-Muslim Culture. Course 132: Muslim Culture (6 cred.; jr., sr., grad.; prereq. 41)	III	MWF	6WeH	Mr. Cline
133f-134w*	Races and Cultures of the Far East—This course will focus on the growth of native civilization in China and Japan. Attention will be given also to the cultures of Mongolia, Tibet, Korea, and southeastern Asia, especially in their relation to the Chinese (6 cred.; jr., sr., grad.; prereq. 41)	II	TThS	6WeH	Mr. Cline
150§	Field Trip in Archeology (1 to 8 cred.; sr. and grad. only; prereq. one Senior College course)	Ar	Ar	Ar	Ar
161s	Primitive Religion—Beliefs and practices in primitive religion. The rôle of the sacred and the supernatural. Beliefs in the life after death (3 cred.; jr., sr., grad.; prereq. 41)	II	MWF	6WeH	Mr. Wallis
162f	Races and Cultures of Negro Africa (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Cline
163w	Ethnology of India—A survey of the primitive tribes, Hindu caste society, and Mohammedan communities in India (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Mandelbaum
165w	Psychological Phases of Culture—The interplay between culture and personality (3 cred.; jr., sr., grad.; prereq. 41)	II	MWF	6WeH	Mr. Mandelbaum

* Students may enter either quarter.

§ This course may be taken for credit only once.

No.	Title	Hour	Day	Bldg.	Instructor
166w	History of Anthropological Theory and Method—A review of the development of anthropology from early times to the present day. Schools of anthropological thought and various approaches to the data of anthropology (3 cred.; jr., sr., grad.; prereq. 41)	I	MWF	6WeH	Mr. Mandelbaum
167s	Primitive Mythology—Plots and motives in folklore and mythology. Mythology as a reflection of culture and interests. Explanatory tales (3 cred.; jr., sr., grad.; prereq. 41)	II	TThS	6WeH	Mr. Wallis
168	*Prehistoric and Primitive Metal Cultures* (3 cred.; jr., sr., grad.; prereq. 41) *(Not offered)*				
170s	Primitive Art—The rôle of esthetics in primitive life, the spread of art styles, symbolism. The graphic and plastic arts and the place of the artist. Music, drama, the dance, in primitive societies (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	6WeH	Mr. Mandelbaum
204f-205w-206s	Seminar in Anthropology (3 cred. per qtr.; grad.)	Ar	Ar	Ar	Mr. Wallis, Mr. Cline, Mr. Mandelbaum

ARCHITECTURE

INSTITUTE OF TECHNOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Roy Jones.

Major sequence in the College of Science, Literature, and the Arts.—Courses AD-II, 51-52-53, 54-55-56, 57-58-59.

(Prerequisites: Courses 4-5-6, AD-I, DP-I, DP-II¶)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

Note.—Consult the Bulletin of the Institute of Technology for program of hours, days, buildings, and instructors.

No.	Title
1f-2w-3s	Introduction to Architecture (3 cred.; open only to students whose major subject is architecture or interior architecture; no prereq.)
4f-5w-6s	Graphic Representation (6 cred.; soph.; no prereq.)
DP-If,w,s‡§	Drawing and Painting, Grade I (6 cred., normally 2 cred. per qtr.; all; no prereq.)
DP-IIf,w,s‡§¶	Drawing and Painting, Grade II (6 cred., normally 2 cred. per qtr.; soph., jr., sr.; prereq. DP-I)
M-If,w,s‡§	Modeling, Grade I (6 cred., normally 2 cred. per qtr.; all; no prereq.)
M-Iaf,w,s§	Modeling for Architects (2 cred., normally 2 cred. per qtr.; open only to students whose major subject is architecture or interior architecture; prereq. registration in Architectural Design)
AD-If,w,s‡‡§	Architectural Design, Grade I (15 cred., normally 5 cred. per qtr.; soph., jr.; prereq. registration in 4-5-6)

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

Note.—Consult the Bulletin of the Institute of Technology for program of hours, days, buildings, and instructors, and for additional courses.

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

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

§ Completion of this course is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark reported. The number of credits earned per quarter may be larger or smaller than the amount indicated as normal.

¶ This course, DP-II, may be postponed until the student's junior year, if necessary.

No.	Title	Hour	Day	Bldg.	Instructor
51f-52w-53s†	History of Architecture (6 cred.; jr., sr.; prereq. consent of instructor)				
54f-55w-56s†	History of Architecture (6 cred.; jr., sr.; prereq. 53)				
57f-58w-59s	Building Materials and Methods (6 cred.; jr., sr.; no prereq.)				
104f	Housing (3 cred.; sr.; no prereq.)				
107f-108w-109s	Furniture and Decoration (6 cred.; jr., sr.; prereq. consent of instructor)				
DP-IIIf,w,s‡§	Drawing and Painting, Grade III (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-II or equiv.)				
DP-IVf,w,s‡§	Drawing and Painting, Grade IV (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-III or equiv.)				
IHP-If§	Illustration (2 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-I or equiv.)				
IHP-IIw,s§	Hand Print Processes (4 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-I or equiv.)				
M-IIf,w,s‡§	Modeling, Grade II (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. M-I)				
SD-If,w§	Stage Design (4 cred., normally 2 cred. per qtr.; jr., sr.; no prereq.)				
AD-IIf,w,s‡‡§	Architectural Design, Grade II (18 cred., normally 6 cred. per qtr.; jr., sr.; prereq. AD-I)				
ID-If,w,s‡‡§	Interior Architectural Design (24 cred., normally 8 cred. per qtr.; sr.; prereq. AD-II)				

ASTRONOMY

Major adviser in the College of Science, Literature, and the Arts.—Professor Luyten.

Major sequence in the College of Science, Literature, and the Arts.—Courses 51-52-53, 101, and Mathematics 50, 51, 105.

(Prerequisites: Mathematics 1, 6-7, or physical science and Mathematics 6.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
11f*	Descriptive Astronomy (5 cred.; all; no prereq.)	IV	MTWFS¶	150Ph	Mr. Luyten
11s*	Descriptive Astronomy (5 cred.; all; no prereq.)	IV	MTWFS¶	133Ph	Mr. Luyten

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51w*	Astronomy (3 cred.; jr., sr.; prereq. Math. 6)	IV	MWF	133Ph	Mr. Luyten
52w	Astrophysics (4 cred.; prereq. 51 or 11 and Math. 6)	II	MTWF	359Ph	Mr. Luyten
53s	Stellar Astronomy (3 cred.; prereq. 51 or 11 and Math. 6)	II	MWF	359Ph	Mr. Luyten
101f	Celestial Mechanics (3 cred.; jr., sr., grad.; prereq. Math. 51)	II	MWF	359Ph	Mr. Luyten
140f	Least Squares (3 cred.; prereq. 51 or 11 and at least Math. 51)	II	MWF	359Ph	Mr. Luyten

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

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* No student may receive credit for both Course 11 and Course 51.

† 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.

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

§ Completion of this course is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark reported. The number of credits earned per quarter may be larger or smaller than the amount indicated as normal.

¶ The Saturday lecture will be replaced by an evening's observation with the telescope when the weather permits.

BACTERIOLOGY

MEDICAL SCHOOL

Major adviser in the College of Science, Literature, and the Arts.—Dr. Larson.

Major sequences in the College of Science, Literature, and the Arts.—Sequence A. For work in medical or public health bacteriology, Courses 101-102, 114, 116, 120, 124, and Zoology 51.

(Prerequisites: Zoology 1-2-3 and 10 credits in chemistry.)

Sequence B. For work in industrial bacteriology, Courses 103, 114, 121-122, 123, 150-151.

(Prerequisites: Bacteriology 41; 4 credits in botany or zoology; 15 credits in chemistry; and 8 credits in biochemistry or organic chemistry.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
41f,w,s‡¶	General Bacteriology (5 cred.; soph., jr., sr.; prereq. 10 cred. in chemistry and 4 cred. in botany or zoology)	VII, VIII, IX	MWF	MH	Ar

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

101w*‡¶	Medical Bacteriology (5 cred.; jr., sr., grad.; prereq. Zool. 1-2-3 and 10 cred. in chem.)				
	Lect.	IV	MWF	MH	Dr. Henrici,
	Lab. Sec. 1	I, II	MWF	MH	Dr. Larson
	2	I, II	TThS	MH	
102s*‡	Medical Bacteriology (4 cred.; jr., sr., grad.; prereq. 101)				
	Lect.	I	MWF	MH	Dr. Larson
	Lab. Sec. 1	II, III	M	MH	Dr. Henrici
		II	WF	MH	Dr. Green
	2	I, II	T	MH	
		I	ThS	MH	
103w	Soil Microbiology (5 cred.; jr., sr., grad.; prereq. 41, and 15 cred. in chem.)				
		I, II, III	TThS	MH	Dr. Skinner
114s	Molds, Yeasts, and Actinomycetes (4 cred.; jr., sr., grad.; prereq. 41 or 101)				
		VII, VIII	TTh	MH	Dr. Henrici
		III, IV	S	MH	
116w	Immunity (3 cred.; jr., sr., grad.; prereq. 101, 102)				
		VI, VII, VIII	TTh	MH	Dr. Larson
120s	Diseases of Animals Transmissible to Man (3 cred.; jr., sr., grad.; prereq. 101, 102)				
		VI	MWF	MH	Dr. Green
121f-122w†	Physiology of Bacteria (6 cred.; jr., sr., grad.; prereq. Bact. 41 and 8 cred. in org. chem. or biochem.)				
		III	TThS	MH	Dr. Halvorson
123s	Applied Bacteriology (3 cred.; jr., sr., grad.; prereq. 121-122)				
		III	TThS	MH	Dr. Halvorson
124f	Filterable Viruses (4 cred.; jr., sr., grad.; prereq. 102)				
	Lect.	VI	MF	MH	Dr. Green
	Lab.	VI, VII	W	MH	
		VII	MF	MH	

* Both Courses 101 and 102 must be completed before credit will be given for either.

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

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

¶ No student may receive credit for both Course 41 and Course 101.

No.	Title	Hour	Day	Bldg.	Instructor
150f-151w†	Advanced Bacteriology (6 cred.; jr., sr., grad.; prereq. 101-102 or 41, 103, 114)	VI,VII,VIII,IX	TTh	MH	Dr. Henrici, Dr. Halvorson
153f,w,s	Problems in Bacteriology (Cred. ar.; prereq. permission of chairman of dept.)	Ar	Ar	Ar	Staff

BIOSTATISTICS

See page 86.

BOTANY

Major adviser in the College of Science, Literature, and the Arts.—Professor Burr.

Major sequences in the College of Science, and the Arts.—

A. In Botany, Courses 61, 62, 63, 113, 118, 119, 131, 140, and additional credits in approved courses to make a total of 30 credits in Senior College courses.

B. In special fields, such as morphology, taxonomy, physiology, or ecology, a major will consist of the respective courses with numbers over 100 and additional credits in approved courses to make a total of 30 credits in Senior College courses.

(Prerequisites: *For sequences A and B:* Courses 1, 2, 5, 7, 21, 22. If possible, beginning chemistry and at least one year of French or German should be completed as part of the Junior College work.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Butters.

Requirements for a teacher's certificate.—Major recommendation, 30 credits in botany including Courses 1, 2, 5, 7, 21, 22, 61, 62 and 5 credits of electives.

Minor recommendation, 19 credits in botany including Courses 1, 2, 7, 21, 22 and three additional credits.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	General Botany—A survey lecture course on plants and their human interest, 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 (4 cred.; all; no prereq.)				
	Lect. Sec. 1	III	TThS	BoAud	Mr. Huff
	2	VI	W	BoAud	Mr. Huff
		VI, VII	F	BoAud	Mr. Huff
	3 (Agr. stud. only)	VI	T	BoAud	Mr. Huff
		VI, VII	Th	BoAud	Mr. Huff
	Quiz Sec. 1	I	T		
	2	II	T		
	3	II	Th		
	4	III	M		
	5	III	W		
	6	IV	T		
	7	V	T		
	8	V	Th		
	9	VI	M		
	10 (Agr. stud. only)	VII	T		
	11 (Agr. stud. only)	VIII	Th		

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

No.	Title	Hour	Day	Bldg.	Instructor
1w,s	General Botany (See 1f)				
	Lect.	III	TThS	BoAud	Mr. Huff
	Quiz Sec. 1	I	T		
	2	II	T		
	3	II	Th		
	4	III	M		
	5	IV	M		
	6	IV	T		
2w,s‡	Elementary General Morphology of Plants (3 cred.; all; prereq. 1)				
	Lect.	III, IV	M	BoAud	Mr. Huff
	Lab.	III, IV	WF	1,4,5,8Bo	
3su	Forest Botany (1 cred.; students in agriculture and forestry; no prereq. Given at Itasca Park)				Mr. Rosendahl
5w‡	Elementary Plant Histology (3 cred.; all; prereq. 1)	VI, VII, VIII	WF	1,4,5,8Bo	Mr. Butters
7f‡	Taxonomy of Flowering Plants (3 cred.; all; prereq. 1)	I, II	MWF	1,4,5,8Bo	Mr. Butters
7s‡	Taxonomy of Flowering Plants (See 7f)				
	Sec. 1	I, II	MWF	1,4,5,8Bo	Mr. Abbe
	2	VI, VII, VIII	TTh	1,4,5,8Bo	Mr. Butters
21f‡	Elementary Ecology (3 cred.; all; prereq. 1)	III, IV	MWF	1,4,5,8Bo	Mr. Cooper, Mr. Lawrence
21w‡	Elementary Ecology (See 21f) (Laboratory sections in 21w are limited to 90 each)				
	Lect.	VII	TTh	BoAud	Mr. Cooper, Mr. Lawrence
	Lab. Sec. 1 (Agr. stud. only)	V, VI	TTh	1,4,5,8Bo	
	2 (Agr. stud. only)	VIII, IX	TTh	1,4,5,8Bo	
	3	I, II	ThS	1,4,5,8Bo	
21s‡	Elementary Ecology (See 21f)				
	Lect.	VII	TTh	BoAud	Mr. Cooper, Mr. Lawrence
	Lab. Sec. 1	V, VI	TTh	1.4,5,8Bo	
	2	VIII, IX	TTh	1,4,5,8Bo	
22f,w,s‡	Elementary Plant Physiology (3 cred.; all; prereq. 1 and high school or college chem. or registration in college chem.) (Laboratory sections are limited to 56 each)				
	Lect.	VII	TTh	4Bo	Mr. Burr
	Lab. Sec. 1	V, VI	TTh	104Bo	
	2	VIII, IX	TTh	104Bo	

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

61f‡	Thallophytes (3 cred.; jr., sr.; prereq. 10 cred., incl. 2)	VI, VII	MWF	8Bo	Mr. Moyer
62w‡	Bryophytes and Pteridophytes (3 cred.; jr., sr.; prereq. 10 cred. incl. 2)	VI, VII, VIII	MW	8Bo	Mr. Huff
63s‡	Gymnosperms and Angiosperms (3 cred.; jr., sr.; prereq. 7 and either 2 or 62)	III, IV	MWF	215Bo	Mr. Butters
108w	Pteridophytes (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 62)	Ar	Ar	Ar	Mr. Butters
110	*Gymnosperms* (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 63) *(Not offered)*				
113f-114w-115s*	Advanced Taxonomy of Flowering Plants (9 cred.; jr., sr., grad.; prereq. 10 cred. incl. 7)	VI, VII, VIII	MF	110Bo	Mr. Rosendahl

* Any quarter may be taken separately, except 115s, which requires either 113f or 114w as a prerequisite.

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

No.	Title	Hour	Day	Bldg.	Instructor
118f‡	Cytology I—Cytoplasmic Phenomena (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. including Bot. 5 and an elem. course in chem.)	III-IV	MWF	202Bo	Mr. Moyer
119w‡	Cytology II—Nuclear Phenomena (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. including Bot. 5 and an elem. course in chem.)	III-IV	MWF	202Bo	Mr. Abbe
120s‡‡	Research Methods in Histology and Cytology (3 or 5 cred.; prereq. 118 and 119)	Ar	Ar	202Bo	Mr. Abbe
127f	Anatomy of Vascular Plants (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 5)				
	Lect.	II	TThS	215Bo	Mr. Butters
	Lab.	III, IV	TS		
		III	Th		
		or			
		Ar	Ar		
131f	Field Ecology (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Cooper, Mr. Lawrence
132	*Ecological Anatomy* (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 5 and 21) *(Not offered)*				
133s	Plant Geography of North America (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Cooper
134s‡	Research Methods in Ecology (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Lawrence
136s	Physiology of the Cell (3 cred.; jr., sr., grad.; prereq. 20 cred. in physics, chem., or biochem., or permission of instructor)	II	TThS	202Bo	Mr. Moyer
137w‡	Experimental Ecology (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21 and 22)	VI, VII, VIII	MWF	214Bo	Mr. Lawrence
140w	General Plant Physiology (3 cred.; jr., sr., grad.; prereq. 22, elem. inorg. chem.)	III	MWF	5Bo	Mr. Burr
141f‡‡	Physico-chemical Principles and Measurements in Plant Physiology (3 or 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)				
	Lect.	7:55	MWF	5Bo	Mr. Burr
	Lab.	Ar	Ar	104Bo	Mr. Miller
142w‡‡	Photosynthesis and Other Effects of Radiation (3 or 5 cred.; jr., sr., grad.; prereq. same as for 141)				
	Lect.	7:55	MWF	5Bo	Mr. Burr
	Lab.	Ar	Ar	104Bo	Mr. Miller
143s‡‡	Plant Metabolism (3 or 5 cred.; jr., sr., grad.; prereq. same as for 141)				
	Lect.	7:55	MWF	5Bo	Mr. Burr
	Lab.	Ar	Ar	104Bo	Mr. Miller
144f‡	Applied Spectroscopy in Biology (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)				
	Lect.	Ar	MWF	1Bo	Mr. Miller
	Lab.	Ar	MWF		
145w‡	Advanced Spectroscopy in Biology (3 cred.; jr., sr., grad.; prereq. 144)	Ar	Ar	Ar	Mr. Miller
197f-198w-199s	Problems (3 to 5 cred. per qtr.; jr., sr., grad.; prereq. 20 cred. and permission of instructor)	Ar	Ar	Ar	Ar

For graduate courses given during 1939-40 consult the department.

PLANT PATHOLOGY AND BOTANY

Students in this college may elect courses in Plant Pathology and Botany by arrangement with the department. But before registering for any courses they should get the approval of Assistant Dean Shumway in 219 Administration Building. See the program of the College of Agriculture, Forestry, and Home Economics in this bulletin.

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

‡‡ A fee of $3 is charged for this course. No fee is charged for Botany 141, 142, or 143, 3 credits, lectures only.

CHEMISTRY

INSTITUTE OF TECHNOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Sneed.

Major sequence in the College of Science, Literature, and the Arts.—Analytical Chemistry 1-2; Organic Chemistry 51-52-153; Physical Chemistry 101-102-103.

(Prerequisites: Inorganic Chemistry 13 with its prerequisites; physics, with the prerequisite mathematics.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Palmer O. Johnson.

Requirements for a teacher's certificate.—Major recommendation: Inorganic Chemistry 9-10, 12; Analytical Chemistry 7; Organic Chemistry 51-52 and 10 additional credits in chemistry.

Minor recommendation: Inorganic Chemistry 9-10, 12; Analytical Chemistry 7 and 6 additional credits in chemistry.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

Note.—Analytical Chemistry 1-2 and all courses numbered above 50 count as Senior College courses.

INORGANIC CHEMISTRY

No.	Title	Hour	Day	Bldg.	Instructor
1f‡-2w†‡	General Inorganic Chemistry (For architecture, predental, premedical, medical technology, physical education—women, agriculture, forestry, and home economics students) (4 cred. per qtr.; no prereq.)				Mr. Barber, Mr. Pervier
	1f-2w (For predental, premedical, medical technology, and physical education—women students)				
	Lect.	VI	MWF	225C	
		VI	Th	225C	
	Quiz	VI	T	Ar	
	Lab.	VII, VIII, IX	T	290C	
	1f-2w (For architecture, agriculture, forestry, and home economics students)				
	Lect.	VII	MWF	325C	
		VIII	F	Ar	
	Lab.	VIII, IX	MW	210C	
	1f (For agriculture, forestry, and home economics students)				
	Lect.	VI	MWF	225C	
	Quiz	VIII	F	Ar	
	Lab.	VIII, IX	MW	210C	
3s‡	Qualitative Chemical Analysis (For predental, premedical, medical technology, agriculture, forestry, and home economics students) (4 cred.; prereq. 2)				Mr. Barber, Mr. Pervier
	3s (For predental, premedical, and medical technology students)				
	Lect.	VI	MWF	225C	
	Lab.	VI, VII, VIII, IX	Th	290C	
	3s (For agriculture, forestry, and home economics students)				
	Lect.	VII	MWF	325C	
	Lab.	VIII, IX	MW	210C	

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

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

No.	Title	Hour	Day	Bldg.	Instructor
4f‡-5w†‡	General Inorganic Chemistry (8 cred.; for premedical students only; prereq. entrance cred. in chem.)				
	Lect.	VI	MWF	100C	Mr. Reyerson
	Lab.	VII, VIII, IX	T	210C	
	Quiz	VI	T	100C	
4f‡-5w†‡	General Inorganic Chemistry (8 cred.; primarily for predental and medical technology students; prereq. entrance cred. in chem.)				
	Lect.	VII	MWF	325C	Mr. Maynard
	Lab.	VII, VIII, IX	Th	210C	
	Quiz	VI	Th	100C	
6f‡-7w†‡	General Inorganic Chemistry (10 cred.; all; no prereq. A continuation of this course is 8s)				
	Lect.	II	MWF	225C	Miss Cohen
	Quiz	I	Th	410C	
	Lab. Sec. 1	I, II	TS	210C	
		II	Th	210C	
	2	I, II, III	T	210C	
		II, III	Th	210C	
8s*‡	Qualitative Chemical Analysis (5 cred.; all; prereq. 7)				
	Lect.	II	MWF	225C	Miss Cohen
	Lab. Sec. 1	I, II	TThS	210C	
	2	I, II, III	TTh	210C	
9f‡-10w†‡	General Inorganic Chemistry (10 cred.; all; prereq. entrance cred. in chem.)				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab. Sec. 1	I, II	TThS	290C	
	2	I, II, III	ThS	290C	
9f‡-10w†‡	General Inorganic Chemistry (10 cred.; open only to Agriculture, Forestry, and Home Economics students; prereq. entrance cred. in chem.)				
	Lect.	VII	MWF	100C	Mr. Klug
	Lab.	VIII, IX	MWF	110C	
9w‡-10s†‡§	General Inorganic Chemistry (10 cred.; all; prereq. entrance cred. in chem.)				
	Lect. Sec. 1	III	MWF	325C	Miss Cohen
	2	III	MWF	410C(w) 225C(s)	Mr. Taylor
	Lab. Sec. 1	VI, VII	MWF	210C	
	2	VI, VII	MWF	290C	
11f‡	Qualitative Chemical Analysis (4 cred.; primarily for premedical and predental students; prereq. Course 5, or the old Course 3 as given in 1938-39)				
	Lect.	IV	MWF	225C	Miss Cohen
	Lab.	VI, VII, VIII, IX	F	210C	
11s‡	Qualitative Chemical Analysis (4 cred.; for premedical students only; prereq. Course 5, or the old Course 3 as given in 1938-39)				
	Lect.	VI	MWF	100C	Mr. Reyerson
	Lab.	VI, VII, VIII, IX	T	210C	
11s‡	Qualitative Chemical Analysis (4 cred.; primarily for predental and medical technology students; prereq. Course 5, or the old Course 3 as given in 1938-39)				
	Lect.	VII	MWF	225C	Mr. Maynard
	Lab.	VI, VII, VIII, IX	Th	210C	
12f‡-13w‡¶	Qualitative Chemical Analysis (10 cred.; all; prereq. 10)				
	Fall Lect.	I	TThS	225C	Mr. Taylor
	Lab.	I, II, III	MW	290C	
	Winter Lect.	VI	WF	325C	Mr. Taylor
	Quiz	VI	M	410C	
	Lab.	VII, VIII, IX	WF	290C	
		VII, VIII	M	290C	

* Course 8 may be taken as a substitute for Course 11 by premedical and predental students who have completed Course 6-7. No student may receive credit for both Course 8 and Course 11. Also Course 8 is substantially equivalent to Course 12. See the footnote for Course 12-13.

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

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

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

¶ Students who have completed Course 8 should omit Course 12 and take Course 13.

No.	Title	Hour	Day	Bldg.	Instructor
12s‡¶	Qualitative Chemical Analysis (See 12f-13w)				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab.	I, II, III	ThS	290C	
13f‡¶	Qualitative Chemical Analysis (See 12f-13w; prereq. 12 or 8)				
	Lect.	VI	MW	325C	Mr. Heisig
	Quiz	VI	F	335EE	
	Lab.	VII, VIII, IX	WF	290C	
		VII, VIII	M	290C	
101s	History of Chemistry (2 cred.; sr., grad.; prereq. Org. Chem. 52 or consent of instructor)				
		Ar	Ar	Ar	Miss Cohen
102s‡	Semi-micro Qualitative Analysis (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)				
		Ar	Ar	290C	Mr. Barber
103f-104w-105s	Advanced Inorganic Chemistry (3 to 9 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2, Org. Chem. 52)				
		II	TThS	215C	Mr. Sneed
109w‡-110s‡	Synthetic Inorganic Chemistry (3 to 5 cred. per qtr.: jr., sr., grad.; prereq. 13)				
		Ar	Ar	Ar	Mr. Heisig
117s‡§	Glass Blowing (1 cred.; jr., sr., grad.; no prereq.)				
		VII, VIII, IX	W	10C	Ar

For other courses in Inorganic Chemistry see the Bulletin of the Institute of Technology.

Analytical Chemistry

1w‡-2s*‡	Quantitative Analysis (10 cred.; soph., jr., sr.; prereq. Inorg. Chem. 13)				
	Lect.	VI	M	325C	Mr. Geiger
	Quiz	VI	F	410C	
	Rec.	VI or VII	W	111C	
	Lab. Sec. 1 Any 9 hrs. selected from	VI-IX	MWF	310C	
	2 (winter)	I-IV	T	310C	
		I-III	Th	310C	
		I-II	S	310C	
	2 (spring)	I-IV	T	310C	
		VII-IX	T	310C	
		I-II	Th	310C	
7f‡	Quantitative Analysis (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)				
	Sec. 1 and 2				
	Lect.	VI	F	325C	Mr. Geiger
	Rec. (Limit 35 in each sec.)	VI or VII	W	111C	
	Quiz	VI	M	410C	
	Lab. Any other 8 hrs. selected from	VI-IX	MWF	310C	
	Sec. 3				
	Lect.	VI	T	325C	Ar
	Rec.	VI	Th	325C	
	Lab.	VII, VIII, IX	TTh	310C	
		I, II, III	S	310C	
		or			
		II, III, IV	S	310C	
7s‡	Quantitative Analysis (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)				
	Lect.	VI	T	325C	Ar
	Rec.	VI	Th	325C	
	Lab.	VII, VIII, IX	TTh	310C	
		I, II, III	S	310C	
		or			
		II, III, IV	S	310C	

* Course 2s may precede 1w, if desired.

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

§ Carries credit only for juniors and seniors majoring in natural science.

¶ Students who have completed Course 8 should omit Course 12 and take Course 13.

No.	Title	Hour	Day	Bldg.	Instructor
103f‡	Quantitative Inorganic Microanalysis (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell
104s‡	Microchemistry (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell
122f‡	Advanced Analytical Chemistry—A condensed review of modern fundamentals of gravimetric and volumetric analysis. (1 or 2 cred.; jr., sr., grad.; prereq. quantitative chemistry; 1 lecture, 1 recitation, and 3 to 6 laboratory hours to be arranged)				Mr. Geiger
123f‡	Advanced Analytical Chemistry (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 or permission of instructor)				
	Lect.	Ar	Ar	Ar	Ar
	Lab.	Ar	Ar	310C	
127w‡	Use of Organic Reagents in Analytical Chemistry (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 and Org. Chem. 52)	Ar	Ar	Ar	Ar
131f‡	Application of Indicators (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 and Phys. Chem. 101-102-103)				
	Lect.	VI	MW	315C	Mr. Kolthoff
	Lab.	Ar	Ar	Ar	
132w‡	Electrometric Titrations (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 and Phys. Chem. 101-102-103)				
	Lect.	VI	MW	315C	Mr. Kolthoff
	Lab.	Ar	Ar	Ar	
140w‡	Water Analysis (2 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell

Organic Chemistry

1f‡-2w†‡	Elementary Organic Chemistry (8 cred.; primarily for premedical and predental students; prereq. Inorg. Chem. 11)				
	Lect. (all secs.)	I	MWF	100C	Mr. Arnold
	Lab. conference (all secs.)	II	T	225C	Mr. Arnold
	Quiz (all secs.)	I	T	Ar	Ar
	Lab. Sec. 1	VI-IX	T	390C	
	2	VI-IX	W	390C	
	3	I-IV	S	390C	
1w‡-2s†‡	Elementary Organic Chemistry (See 1f-2w)				
	Lect. (all secs.)	IV	MWF	325C	Mr. Koelsch
	Lab. conference (all secs.)	V	T	100C	Mr. Koelsch
	Quiz (all secs.)	IV	T	Ar	Ar
	Lab. Sec. 1	VI-IX	W	390C	
	2	VI-IX	Th	390C	
	3	I-IV	S	390C	
51f‡-52w†‡-153s‡	Elementary Organic Chemistry (5 cred. per qtr.; open to all except premedical, predental, and pharmacy students; required of all chemical engineers, chemists, and S. L. and A. majors; prereq. 15 cred. in college chemistry. Course 153 is prerequisite to all other advanced courses in organic chemistry)				
	Lect.	III	MWF	100C	Mr. Lauer(f,w), Mr. Smith(s)
	Lab. conference	III	ThS	325C	Mr. Arnold
	Lab. Sec. 1	II, III, IV	T	390C	
		VI, VII, VIII	T	390C	
	2	VI, VII, VIII	TTh	390C	
	3	VI, VII, VIII	WF	390C	
54f-55w†-156s	Elementary Organic Chemistry—Lectures only. The lectures are the same as those in Course 51f-52w-153s, together with general discussions of organic laboratory practice. (3 cred. per qtr.; open to all except premedical, predental, and pharmacy students and students majoring in chemistry; prereq. 15 cred. in college chemistry)	III	MWThF	100C	Mr. Lauer(f,w), Mr. Smith(s)

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

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

No.	Title	Hour	Day	Bldg.	Instructor
105f-106w-107s	Advanced Organic Chemistry (3 cred. per qtr.; jr., sr., grad.; prereq. 153)				
		I	MWF	225C	Mr. Smith

For advanced courses in Organic Chemistry see the Bulletin of the Institute of Technology.

Physical Chemistry

101f-102w-103s	Physical Chemistry—A general survey of the subject (9 cred.; jr., sr., grad.; prereq. two years college chemistry, one year college physics. A knowledge of calculus is advisable)				
	Lect.	IV	MWF	100C	Mr. MacDougall
	Rec. Sec. 1	IV	S	325C	
	2	IV	S	410C	
	3	III	S	225C	
104f‡-105w‡-106s‡	Physical Chemistry Laboratory (To accompany or follow Course 101-102-103; 1 or 2 cred. per qtr.)				
	Lab. conference (for students registered for 2 cred. per qtr.)				
	Sec. 1	VI	W	410C	Mr. Livingston
	2	VI	T	410C	Mr. Livingston
	Lab. Sec. 1	VI, VII, VIII	M		
		VII, VIII	W	190C	
	2	VII, VIII	T		
		VI, VII, VIII	Th	190C	
	3	VI, VII, VIII	F	190C	
107f‡-108w‡	Elementary Physical Chemistry (4 cred. per qtr.; for premedical students only; prereq. two years college chemistry, one year college physics)				
	Lect.	III	MWF	225C	Mr. Glockler
	Rec.	VIII	T	ArC	Mr. Hull
	Lab. Sec. 1	I-III	T	190C	
	2	I-III	Th	190C	
116f-117w-118s	Advanced Physical Chemistry (9 or 12 cred.; jr., sr., grad.; prereq. 103 and calculus)				
		II	TThS	215C	Mr. Glockler
128f-129w-130s	Colloid Chemistry (2 cred. per qtr.; sr., grad.; prereq. 103)				
		Ar	Ar	ArC	Mr. Reyerson
131f‡-132w‡-133s‡	Colloid Chemistry Laboratory (Cred. ar.; sr., grad.; prereq. 129 or 130)				
		Ar	Ar	Ar	Mr. Reyerson
161f-162w	Radioactivity (3 cred. per qtr.; jr., sr., grad.; prereq. Phys. Chem. 103)				
		IV	MWF	215C	Mr. Hull
180f,181w,182s	General Survey of Colloid Chemistry, Colloids in Industry, Colloids in Biology and Medicine (See the Bulletin of the Institute of Technology)				Mr. Freundlich

AGRICULTURAL BIOCHEMISTRY

Students in this college may elect courses in Agricultural Biochemistry by arrangement with the division. But before registering for any courses they should get the approval of Assistant Dean Shumway in 219 Administration Building. See the program of the College of Agriculture, Forestry, and Home Economics in this bulletin.

CHILD WELFARE

Adviser in the College of Science, Literature, and the Arts.—Professor Anderson.

Major advisers in the College of Education.—Professors Anderson and Foster.

For a specialized curriculum in Nursery School and Kindergarten Education, see the Bulletin of the College of Education.

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

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
10s	Introduction to Child Study (2 cred.; 3rd qtr. fr., soph.; no prereq.)	VI	TTh	100Pt	Mrs. Faegre
40w§	Child Training (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)	IV and one hr. ar.	MW	106Pt	Mrs. Foster

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

80w,s	Child Psychology (3 cred.; jr., sr.; prereq. Psy. 1-2)	IV	MWF	202Pt	Mr. Anderson
82s	Later Childhood and Adolescence (3 cred.; prereq. 40 or 80 or equiv.)	II	MWF	202Pt	Mrs. Faegre
130f	Motor, Linguistic, and Intellectual Development of the Child (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)	I	MWF	202Pt	Mr. Anderson
131w	Personality, Emotional, and Social Development of the Child (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)	I	MWF	202Pt	Mr. Anderson
133w-134s†	Measurement of Child Personality (4 cred.; sr., grad.; prereq. 10 cred. in psy. or ed. psy. and Ed. Psy. 60, or Biometry 101, and permission of instructor)	VI	TTh	202Pt	Miss Goodenough
140f	Behavior Problems (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	I, II	S	202Pt	Miss Goodenough
141w-142s	Practicum in Behavior Problems (Cred. ar.; sr., grad.; prereq. 140, and permission of instructor)	Ar	Ar	201Pt	Miss Goodenough
170s	Parent Education (2 cred.; sr., grad.; prereq. 15 cred. in child welfare or home economics or education or psychology or sociology or preventive medicine)	VI	MW	202Pt	Mrs. Foster, Mrs. Faegre
190s	Principles of Mental Measurement of Young Children (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	II	TTh	202Pt	Miss Goodenough

For Graduate Students Only

230f-231w-232s	Seminar in Recent Literature	Ar	Ar	202Pt	Mr. Anderson
233f-234w-235s	Research in Child Development	Ar	Ar	Ar	Mr. Anderson and others
236f-237w-238s	Seminar in Human Development—Fall: Infant; Winter: Child; Spring: Adolescent	VI, VII	F	204EPt	Miss Goodenough
250f-251w-252s	Seminar in Nursery Education	VII	TTh	202Pt	Mrs. Foster
260w	Seminar in Physical Growth	Ar	Ar	226IA	Miss Boyd
261f-262w-263s	Statistical and Laboratory Work in Physical Growth	Ar	Ar	226IA	Miss Boyd
270f-271w-272s	Readings in Child Development	Ar	Ar	101Pt	Mr. Anderson and others
273f	Techniques of Parent Education	VI	MWF	202Pt	Ar
274w	Field Work in Parent Education	Ar	Ar	204EPt	Ar
275s	Seminar in Parent-Child Relations	VI, VII	W	204EPt	Ar
290f-291w†	Mental Examination of Preschool Children	III	MWF	202Pt	Miss Goodenough

NOTE.—See also Courses Ed. T. 55-59, 75, 76A-76B-76C, 77A-77B-77C, and Ed. C. I. 130, offered by the Institute of Child Welfare, and listed under Methods and Directed Teaching and Curriculum and Instruction in the program of the College of Education.

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

§ Offered fall and spring as Home Economics Education 90. See the program of the College of Education in another part of this bulletin.

CLASSICS

Major adviser in the College of Science, Literature, and the Arts.—Professor Ogle.

Major sequences in the College of Science, Literature, and the Arts.—

GREEK

The elementary course 1f-2w-3s and twenty-seven credits in courses numbered above 50.

LATIN

Any three of the courses with numbers between 50 and 100; and one of the following combinations: (a) Any six courses numbered above 100; (b) any three courses numbered above 100; and Greek 51, 52, 53 or History 50-51-52.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Cram.

Requirements for a teacher's certificate in Latin.—Major recommendation: Course 73f-74w-75s and any two of the courses with numbers between 50 and 100, and three courses with numbers over 100, including 111f-112w-113s.

Minor recommendation: Course 73f-74w-75s and any two of the courses with numbers between 50 and 100.

To secure a recommendation from the department to take Special Methods and Directed Teaching in Latin a student must make a grade of C or better in Course 73f-74w-75s.

GREEK

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†	Beginning Greek (10 cred.; all; no prereq.)	IV	MTWFS	114F	Mr. Heller
3s	Selections from Attic Prose (5 cred.; all; prereq. 1-2)	IV	MTWFS	114F	Mr. Heller

Senior College Courses

Courses 51, 52, 53, 71, 72, 73 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51f	Lucian (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
52w	Homer (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
53s	Plato, Apology and Selections (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
71f	Tragedy (3 cred.; jr., sr.; prereq. any two of 51,52,53)	II	MWF	112F	Mr. Heller
72w	Comedy (3 cred.; jr., sr.; prereq. any two of 51,52,53)	II	MWF	112F	Mr. Heller
73s	Hellenistic Literature (3 cred.; jr., sr.; prereq. any two of 51,52,53)	Ar	Ar	118F	Mr. Ogle
101	*Philosophy: Plato* (3 cred.; jr., sr., grad.; prereq. any two of 71,72,73 or 51,52,53 with consent of instructor) *(Not offered)*				
102	*Philosophy: Aristole's Ethics* (3 cred.; jr., sr., grad.; prereq. 101 or any two of 71,72,73) *(Not offered)*				

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

No.	Title	Hour	Day	Bldg.	Instructor
103	*Lyric Poetry* (3 cred.; jr., sr., grad.; prereq. any two of 71,72,73) *(Not offered)*				
111	*History: Herodotus* (3 cred.; jr., sr., grad.; prereq. any two of 71,72,73 or 51,52,53 with consent of instructor) *(Not offered)*				
112	*History: Thucydides* (3 cred.; jr., sr., grad.; prereq. 101 or 111 or any two of 71,72,73) *(Not offered)*				
113s	New Testament (3 cred.; jr., sr.; prereq. any one course numbered above 70 or 51,52,53 with consent of instructor)	Ar	Ar	112F	Mr. Ogle
121f-122w-123s†	Advanced Composition (9 cred.; jr., sr., grad.; prereq. 24 credits in Greek)	Ar	Ar	112F	Mr. Heller

For Graduate Students Only

201f-202w-203s	Graduate Seminar: Greek Literary Bibliography and Criticism (9 cred.)	Ar	Ar	Ar	Mr. Heller
211-212-213	*Graduate Seminar: Greek Epic* (9 cred.) *(Not offered)*				
221-222-223	*Graduate Seminar: Greek Drama and Lyric Poetry* (9 cred.) *(Not offered)*				
231f-232w-233s	Graduate Seminar: Greek Philosophy (9 cred.)	Ar	Ar	Ar	Mr. Heller

Courses for Which No Knowledge of Greek Is Required

(See page 38)

LATIN

Junior College Courses

1f-2w†	Beginning Latin (10 cred.; all; no prereq.)	IV	MTWFS	110F	Mr. Cram
3s	Caesar (5 cred.; all; prereq. 1-2, or 1 yr. of high school Latin)	IV	MTWFS	110F	Mr. Cram
11f	Vergil I (5 cred.; all; prereq. 1-2, 3, or 2 yrs. of high school Latin)	III	MTWThF	110F	Mr. Cram
12w	Vergil II (5 cred.; all; prereq. 11, or 3 yrs. of high school Latin)	III	MTWThF	110F	Mr. Cram

Senior College Courses

Courses 51, 52, 53, 63, 73-74-75, 81-82-83 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51f	Pliny's Letters (3 cred.; jr., sr.; prereq. 12, or 3 or 4 yrs. of high school Latin)	II	TThS	109F	Mr. Ogle
52w	Horace (3 cred.; jr., sr.; prereq. 51 or 63)	II	TThS	109F	Mr. Ogle
53	*Suetonius, Selected Lives* (3 cred.; jr., sr.; prereq. 51 or 52 or 63) *(Not offered)*				
63s	Plautus and Terence (3 cred.; all; prereq.¶ 12, or 4 yrs. of high school Latin)	II	TThS	109F	Mr. Ogle
73f-74w-75s†	Prose Composition (3 cred.; all; prereq. 12, or 4 yrs. of high school Latin)	I	T	114F	Mr. Cram
81-82-83	*Survey of Roman Literature* (9 cred.; jr., sr.; prereq. any one of Courses 51,52,53, 63) *(Not offered)*				
111f-112w-113s†	Advanced Prose Composition (3 cred.; jr., sr., grad.; prereq. 73-74-75)	I	T	109F	Mr. Ogle
121f	Advanced Vergil (3 cred.; jr., sr., grad.; prereq.*)	II	MWF	109F	Mr. Ogle

* Any two of the courses with numbers between 50 and 100.

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

¶ A student who enters in the spring quarter with three years of high school Latin may, by special permission, take Course 63s.

No.	Title	Hour	Day	Bldg.	Instructor
131	*Juvenal* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
133s	Vulgar Latin (Development of Latin into Romance) (3 cred.; jr., sr., grad.; open to advanced students of Latin or a Romance language with the consent of the instructor)	II	MWF	109F	Mr. Ogle
142	*Tacitus* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
151	*Advanced Cicero* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
152w	Lucretius (3 cred.; jr., sr., grad.; prereq.*)	II	MWF	109F	Mr. Ogle
171f,172w,173s	Independent Reading Course (3 cred. per qtr.; prereq.*; open to students of exceptional ability with the consent of the department)	Ar	Ar	118F	Ar

For Graduate Students Only

201f-202w-203s	Graduate Seminar: Cicero (9 cred.)	VIII, IX	T	108F	Mr. Ogle
211-212-213	*Graduate Seminar: The Latin Epic* (9 cred.) *(Not offered)*				
221-222-223	*Graduate Seminar: Lyric Poetry* (9 cred.) *(Not offered)*				
231-232-233	*Graduate Seminar: Latin Historiography* (9 cred.) *(Not offered)*				
241f-242w-243s	Graduate Seminar: Introduction to Classical Philology (9 cred.)	VIII, IX	Th	110F	Mr. Cram

Courses for Which No Knowledge of Greek or Latin Is Required§

61f,62w‖	Greek and Latin Drama (2 cred. per qtr.; jr., sr.; no prereq.)	III	TTh	114F	Mr. Ogle
81w	Greek Mythology—The origin and development of myths (2 cred.; jr., sr.; no prereq.)	I	WF	114F	Mr. Heller
82s	Ancient Mythology in Relation to Literature and Art (2 cred.; jr., sr.; no prereq.)	I	WF	114F	Mr. Heller
92-93†	*Classical Literary Tradition* (4 cred.; jr., sr.; no prereq.) *(Not offered)*				
106w	General Linguistics (3 cred.; jr., sr., grad.; prereq. any two courses numbered above 50 in a foreign language)	IV	MWF	109F	Mr. Ogle
107s	Cultural Aspects of Language (3 cred.; jr., sr., grad.; prereq. any two courses numbered above 50 in a foreign language)	IV	MWF	109F	Mr. Ogle

COMPARATIVE PHILOLOGY AND LINGUISTICS

Courses which belong under this heading are listed in other departmental statements as follows:

Anthropology 105f. Elements of Language
Classics 106w. General Linguistics
Classics 107s. Cultural Aspects of Language
Classics 133s. Vulgar Latin
English 100f. Old English
English 102w. Old English Poetry
English 103s. Beowulf
English 165w. The Historical Study of Modern English
German 110f-111w-112s. Introduction to Germanic Philology
German 115f-116w-117s. Middle High German Literature
German 192f. Gothic—Introduction to Germanic Linguistics
German 193w. Gothic Texts
German 194s. Old Saxon
German 195w. Introduction to Old Norse Language and Literature
German 196s. Eddic Poetry
German 209f-210w-211s. Old High German
German 215f-216w-217s. Seminar: Middle High German Texts

* Any two of the courses with numbers between 50 and 100.

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

§ These courses can be used as a minor only by students who are majoring in Classics.

‖ Students may enter either quarter.

DRAWING AND DESCRIPTIVE GEOMETRY

INSTITUTE OF TECHNOLOGY

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
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.)				
	Sec. 1	I, II	MWF	411C	Mr. Doseff
	2	VI, VII	MWF		
	3	VIII, IX	MWF		
44f,w,s	Lettering—A practical course in plain lettering. (1 cred.; all; no prereq.)				
	Sec. 1	IV	T	21E(fall) 21E(winter) 107E(spring)	Mr. Potter
	2	II	Th	227E(fall) 205E(winter) 138EE(spring)	Mr. Quaid
45f,w,s	Alphabets—Construction and analysis of various types of letters and their arrangement. Exercises and reference work. (2 cred.; soph., jr., sr.; no prereq.)				
		III	TTh	206E(fall) 7E(winter) 22E(spring)	Mr. Levens

Senior College Courses

64w	Graphic Arts—Field, development, and application in art and industry. Design and composition. Discussion of materials, style, and technique. (3 cred.; jr., sr.; prereq. consent of instructor)				
		IV	MWF	206E	Mr. Doseff

Course 64w is one of three courses related in general subject-matter of special interest to students of journalism and advertising. The other two, listed elsewhere in this bulletin, are Journalism 65f, "Graphic Arts: Processes," and Business Administration 194s, "Advanced Advertising Procedure."

81-82-83f,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.)				
		Ar	Ar	Ar	Mr. Doseff
86-87f,w,s†	Anatomical Drawing (3 cred. per qtr.; prereq. 43 or equiv.)				
		Ar	Ar	Ar	Mr. Doseff

Other courses offered by the Department of Drawing and Descriptive Geometry and listed in the Bulletin of the Institute of Technology are open to students of this college only by special permission of the Students' Work Committee.

ECONOMICS

For courses, major advisers, and major sequences in Economics, see the program of the School of Business Administration, in another part of this bulletin.

EDUCATION

Some of the courses in Education, which are listed in another part of this bulletin, may be taken by students in this college by special permission of the Students' Work Committee and the consent of the College of Education. Requests for the special permission should be submitted by Junior College students to Assistant Dean Bussey in 106 Folwell Hall and by Senior College students to Assistant Dean Thomas in 219 Folwell Hall.

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

ENGLISH

Major advisers in the College of Science, Literature, and the Arts.—Associate Professor McDowell; Assistant Professors Carr and Jackson.

Major sequence in the College of Science, Literature, and the Arts.—

A total of at least 32 credits for the entire sequence, comprising the following:

A. Course 75, Chaucer; 55-56, Shakespeare; 62, Milton.

B. Additional credits in Senior College courses, of which at least twelve must be from courses numbered 100 or above.

(Prerequisites: Courses 21-22 or 22-23.§)

Composition 65 is recommended as an excellent course for majors in English.

Major advisers in the College of Education.—Professor Dora Smith; Associate Professor Nichols.

Requirements for a teacher's certificate.—

	Credits
a. English as a major subject:	
English 22-23. Introduction to Literature	10
English 55-56. Shakespeare	6
English 73-74. American Literature	6
Composition 27-28. Advanced Writing	6
Speech	6
Additional credits, all of which must be secured in courses numbered 100 or above	6
Total credits	40
b. English as a minor subject:	
English 22-23. Introduction to Literature	10
English 55-56. Shakespeare	6
English 73-74. American Literature	6
Composition 27-28. Advanced Writing	6
Total credits	28

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs	Freshman English	See Composition, page 43.			
21f-22w-23s¶‖	Introduction to Literature—21f: Marlowe, Spenser, Bacon, Browne, Milton, and Bunyan; 22w: Dryden, Pope, Swift, Addison and Steele, Johnson, Boswell, Fielding, and Sheridan; 23s: Wordsworth, Byron, Shelley, Keats, Lamb, Carlyle, Browning, and Arnold (15 cred.; all; prereq.*)				
	Sec. 1	III	MTWThF	301F	Mr. Thomas
	2	VI	MTWThF	301F	Miss Jackson
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.*)				
		VII	MWF	301F(fall)	Mr. Conklin
				301F(winter)	Mr. Sanford
				166Ph(spring)	Mr. Beach
40w-41s‖	The Bible As Literature (6 cred.; all; prereq.*)				
		IV	MWF	311½F	Mr. Powell

* English A-B-C or Composition 4-5-6 or exemption from requirement.

§ Course 22-23 is required for a teacher's certificate.

¶ Students may enter any quarter. Students must take either 21 and 22 or 22 and 23 to receive credit. Two quarters are required as prerequisite for a major sequence; the second and third quarters are required for a teacher's certificate. Three quarters are recommended.

‖ Students may enter any quarter.

Senior College Courses

Courses 52-53, 55-56, 58-59, 62, 73-74, 75, 76, 77-78, 86 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

No.	Title	Hour	Day	Bldg.	Instructor
52f-53w†‖	The English Novel—52f: The reading of novels by Defoe, Fielding, Fanny Burney, Jane Austen, Scott, Thackeray; 53w: The reading of novels by Dickens, Charlotte and Emily Brontë, George Eliot, Trollope, Meredith (6 cred.; jr., sr.; prereq.§)				
		VI	MWF	204F	Mr. Hillhouse
55f-56w†	Shakespeare—Course 55: The reading of *The Comedy of Errors, The Two Gentlemen of Verona, The Taming of the Shrew, The Merchant of Venice, Much Ado About Nothing, Twelfth Night,* with collateral reading. *Midsummer Night's Dream, The Tempest,* to be read independently. Course 56: The reading of *Richard II, Henry IV,* 1 and 2, *Henry V, Richard III, Julius Caesar, Hamlet, Macbeth,* with collateral reading (6 cred.; jr., sr.; prereq.§)				
	Sec. 1	I	TThS	204F	Mr. Hessler
	2	II	TThS	9F	Mr. Brown(f), Miss Atkins(w)
	3	VI	MWF	114F	Miss Atkins
	4	VI	MWF	321F	Miss Carr(f), Mr. Hessler(w)
	5	VII	MWF	205F	Mr. Dunn
55w-56s†	Shakespeare—(See 55f-56w)				
	Sec. 1	III	TThS	306F	Mr. Flanagan(w), Miss Carr(s)
	2	VI	MWF	205F	Mr. Dunn(w), Mr. Hessler(s)
55s	Shakespeare (1st qtr. of 55-56. See 55f-56w)				
	Sec. 1	I	TThS	213F	Mr. Brown
	2	II	MWF	114F	Miss Atkins
58f-59w†	Nineteenth-Century Prose (6 cred.; jr., sr.; prereq.§)				
		II	TThS	204F	Mr. Beach
61	*American Pronunciation* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
62s	Milton (4 cred.; jr., sr.; prereq. 21-22 or 55-56)				
		II	MTThF	205F	Mr. Dunn
63	*American Usage* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
73f-74w†	American Literature (6 cred.; jr., sr.; prereq.§)				
		II	MWF	301F	Mr. McDowell
75f	Chaucer (4 cred.; jr., sr.; prereq.§)				
		III	MTThF	305F	Miss Carr
75w	Chaucer (See 75f)	VI	MTWF	303F	Miss Carr
75s	Chaucer (See 75f)	III	MTThF	305F	Mr. Dunn
76s	American Literature since 1885 (3 cred.; jr., sr.; prereq. 73-74)				
		II	MWF	305F	Mr. McDowell
77f-78w	Classic Myths and the Classic Tradition in English Poetry (6 cred.; jr., sr.; prereq.§)				
		III	TThS	15F	Mr. Brown
81-82†	*Survey of Middle English* (6 cred.; jr., sr.; prereq.§) *(Not offered)*				
86	*Forms of English Verse* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
97f-98w-99s	Independent Reading Course (9 cred.; jr., sr.; prereq. permission of department)				
		Ar	Ar	Ar	Mr. Dunn(f), Miss Atkins(w), Mr. Brown(s)
100f	Old English (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)				
		II	TWThF	302F	Mr. Ruud
102w	Old English Poetry (3 cred.; jr., sr., grad.; prereq. 100)				
		II	MWF	302F	Mr. Ruud

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

§ Composition 4-5-6 and 6 additional credits, or English A-B-C, or 10 credits in 21-22-23.

‖ Students may enter any quarter.

No.	Title	Hour	Day	Bldg.	Instructor
103s	Beowulf (3 cred.; jr., sr., grad.; prereq. 100)	II	MWF	302F	Mr. Ruud
105w-106s†	Eighteenth-Century Poetry (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	204F	Mr. Moore
107-108†	*Eighteenth-Century Prose* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
109f-110w†	Romantic Poets (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	III	TThS	204F	Mr. Nichols
111f-112w†	Seventeenth-Century Prose (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	IV	MWF	204F	Mr. Moore
113f	American Short Story (3 cred.; jr., sr., grad.; prereq. 73-74)	III	MWF	205F	Mr. McDowell
123f-124w-125s†	Technique of the Novel (9 cred.; sr., grad.; prereq. 6 cred. above 50 and permission of instructor)	4:00-6:00	T	205F	Mr. Beach
126f-127w†	Drama, 1660-1880 (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	306F	Miss Jackson(f), Mr. Nichols(w)
129s	Modern Drama: 1880 to Present (4 cred.; jr., sr., grad.; prereq. 55-56 or 126-127)	II	MTThF	204F	Mr. Stoll
133f	Ballads (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	III	MWF	204F	Mr. Ruud
135w	Spenser (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	I	MWF	205F	Mr. Stoll
136s	Advanced Shakespeare (4 cred.; jr., sr., grad.; prereq. 55-56)	I	MTThF	205F	Mr. Stoll
140s	Advanced Chaucer (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75)	IV	MTWF	205F	Mr. Ruud
141-142-143	*Historical Grammar* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75 or 81-82) *(Not offered)*				
146-147†	*Medieval Romances: Stories of Thebes and Troy, of Alexander, of Charlemagne, and of English Heroes* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75 or 81-82) *(Not offered)*				
148w-149s	Arthurian Romances (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	305F	Miss Carr
150	*Victorian Poetry* (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
151s	Recent Poetry (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	III	TWThF	204F	Miss Jackson
152	*Pre-Elizabethan Drama* (3 cred.; jr., sr., grad.; prereq. 55-56) *(Not offered)*				
153s	Seventeenth-Century Lyrists (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	IV	MWF	204F	Mr. Moore
154w-155s†	American Novel (6 cred.; jr., sr., grad.; prereq. 73-74, or 52-53)	III	MWF	205F	Mr. McDowell
156s	The American Drama to 1880 (3 cred.; jr., sr., grad.; prereq. 73-74)	VI	MWF	303F	Mr. Nichols
157f-158w†	Elizabethan Non-Dramatic Literature (in 1939-40 exclusive of Spenser) (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 55-56 or 170)	I	TThS	303F	Mr. Brown
159	*Colonial Literature in America* (3 cred.; jr., sr., grad.; prereq. 73-74) *(Not offered)*				
160	*History of the English Language* (2 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 100) *(Not offered)*				
162f	Restoration Non-Dramatic Literature (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	204F	Mr. Moore
163-164†	*Restoration Drama* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				

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

No.	Title	Hour	Day	Bldg.	Instructor
165w	The Historical Study of Modern English (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)				
		III	MWF	204F	Mr. Ruud
167w-168s†	English Literary Criticism (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)				
		II	TThS	306F	Mr. Brown
169f	Browning and Tennyson (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)				
		II	MTThF	205F	Mr. Stoll
170f	Elizabethan Drama (4 cred.; jr., sr., grad.; prereq. 55-56)				
		I	MTThF	205F	Mr. Stoll
213f-214w-215s	Eighteenth-Century Drama				
		4:00 to 6:00	Th	312Lib	Mr. Moore
231f-232w-233s	Shakespeare's Tragic and Comic Art				
		4:00 to 6:00	W	312Lib	Mr. Stoll
234f-235w-236s	Piers Plowman, the Pearl Poet, and Other Alliterative Verse of the Age of Chaucer				
		4:00 to 6:00	M	312Lib	Mr. Ruud
262f-263w-264s	Studies in the Nineteenth-Century Novel				
		10:30 to 12:30	S	312Lib	Mr. Hillhouse
265f-266w-267s	American Romanticism II: Middle States				
		4:00 to 6:00	F	312Lib	Mr. McDowell

COMPOSITION

Major advisers in the College of Science, Literature, and the Arts.—Associate Professor Nichols; Assistant Professor Phelan.

Major sequence in the College of Science, Literature, and the Arts.—Either 67-68 or 69-70-71; and 81-82-83; and 91-92-93; and 15 credits in Senior College courses in English to be chosen under the direction of a major adviser from a list of recommended courses.

(Prerequisites: Course 27 and two of the following: 28, 29, 65; also English 21-22 or 22-23.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

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.

Assignments to all sections in Freshman English and composition are contingent upon the student's presence in class at the first scheduled meeting. A student who is absent from the first meeting of the course forfeits his place in the section.

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. 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.

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

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs	Freshman English (15 cred.; all; prereq. placement test)				
		I	MTWThF	Ar	Ar
		II	MTWThF		
		III	MTWThF		
		IV	MTWFS		
		VI	MTWThF		
		VII	MTWThF		
Aw-Bs	Freshman English (2 qtrs. of A-B-C. See Af-Bw-Cs)				
		I	MTWThF	Ar	Ar
Cf	Freshman English (3rd qtr. of A-B-C. See Af-Bw-Cs)				
		VI	MTWThF	Ar	Ar

With Writing Laboratory

All students who as a result of the placement tests in English are assigned to Composition 4f-5w-6s are required to register for the sections of this course with writing laboratory.* There is no such restriction for students who take Course 4w-5s or Course 4s.

4f-5w-6s	Freshman Composition (9 cred.; all; prereq. placement test)					
	Sec. 1	Rec.	I	WF	Ar	Ar
		Lab.*	I, II	M		
	Sec. 1a	Rec.	I	MW		
		Lab.*	I, II	F		
	Sec. 2	Rec.	II	MF		
		Lab.*	I, II	W		
	Sec. 2a	Rec.	II	WF		
		Lab.*	I, II	T		
	Sec. 2b	Rec.	II	MW		
		Lab.*	I, II	Th		
	Sec. 3	Rec.	III	WF		
		Lab.*	III, IV	M		
	Sec. 3a	Rec.	III	MW		
		Lab.*	III, IV	F		
	Sec. 3b	Rec.	III	TTh		
		Lab.*	II, III	S		
	Sec. 4	Rec.	IV	MF		
		Lab.*	III, IV	W		
	Sec. 4a	Rec.	IV	WF		
		Lab.*	III, IV	T		
	Sec. 5	Rec.	V	WF		
		Lab.*	V, VI	M		
	Sec. 6	Rec.	VI	MW		
		Lab.*	V, VI	F		
	Sec. 6a	Rec.	VI	MF		
		Lab.*	V, VI	W		
	Sec. 6b	Rec.	VI	WF		
		Lab.*	V, VI	T		
	Sec. 6c	Rec.	VI	MW		
		Lab.*	VI, VII	Th		
	Sec. 7	Rec.	VII	WF		
		Lab.*	VII, VIII	M		

* In the spring quarter a third recitation will be substituted for the laboratory work. For Sec. 3b, the spring quarter schedule will be III TThS. For all other sections the three recitations in the spring will be on MWF at the hours announced for recitations in the fall and winter. For example, Sec. 1 will meet at I MWF; Sec. 2b at II MWF; etc.

No.	Title	Hour	Day	Bldg.	Instructor
	Sec. 7a Rec.	VII	MW		
	Lab.*	VII, VIII	F		
	Sec. 7b Rec.	VII	MF		
	Lab.*	VII, VIII	W		
	Sec. 7c Rec.	VII	WF		
	Lab.*	VII, VIII	T		

Without Writing Laboratory

Course 4f-5w-6s, without writing laboratory, is open only to students who are eligible for course A-B-C. Course 4w-5s and 4s, which are without writing laboratory, are open to all students who are eligible for Course 4.

4f-5w-6s	Freshman Composition (9 cred.; all; prereq. placement test)				
	Sec. 1	II	MWF	Ar	Ar
	2	II	TThS		
	3	VI	MWF		
	4	VII	MWF		
4w-5s	Freshman Composition (2 qtrs. of 4-5-6. See 4f-5w-6s)				
	Sec. 1	II	TThS	Ar	Ar
	2	V	MWF		
4s	Freshman Composition (1st qtr. of 4-5-6. See 4f-5w-6s)				
	Sec. 1	III	TThS	Ar	Ar
	2	V	MWF		
6f	Freshman Composition (3rd qtr. of 4-5-6. See 4f-5w-6s)				
		VII	MWF	Ar	Ar
27f-28w§	Advanced Writing—In the first half of this course the writing is exposition, with stress on logical organization; in the second it consists of description and narration (6 cred.; all; prereq. A-B-C or 4-5-6 or exemption from requirement)				
	Sec. 1 (fall, winter)	I	TThS	Ar	Mr. Clark(f), Mr. Bouvier(w)
	2 (fall, winter)	II	MWF	Ar	Mr. Hessler
	2a (fall, winter)	II	TThS	Ar	Mr. Mallam
	2b (fall only)	II	TThS	Ar	Mr. Flanagan
	3 (fall, winter)	III	MWF	Ar	Miss Scallon
	3a (fall only)	III	MWF	Ar	Mr. Bouvier
	4 (fall, winter)	IV	MWF	Ar	Miss Atkins(f), Mr. Briggs(w)
	4a (fall, winter)	IV	MWF	Ar	Mrs. del Plaine
	5 (fall, winter)	VI	MWF	Ar	Miss Christie
	5a (fall only)	VI	MWF	Ar	Mrs. McFadyen
27w-28s§	Advanced Writing. (See 27f-28w)				
	Sec. 1	I	MWF	Ar	Mr. Clark(w), Mrs. Phelan(s)
	1a	I	MWF	Ar	Mr. Briggs
	1b	I	MWF	Ar	Miss Scallon(w), Mrs. del Plaine(s)
	2	II	MWF	Ar	Mr. Flanagan
	2a	II	MWF	Ar	Mrs. McFadyen
27s§	Advanced Writing (1st qtr. of 27-28. See 27f-28w)				
	Sec. 1	I	MWF	Ar	Mr. Clark
	2	II	MWF	Ar	Mr. Mallam
28f§	Advanced Writing (2nd qtr. of 27-28. See 27f-28w)				
		II	MWF	Ar	Mr. Nichols

* In the spring quarter a third recitation will be substituted for the laboratory work. For Sec. 3b, the spring quarter schedule will be III TThS. For all other sections the three recitations in the spring will be on MWF at the hours announced for recitations in the fall and winter. For example, Sec. 1 will meet at I MWF; Sec. 2b at II MWF; etc.

§ To receive credit for any part of this course a student must complete 27-28 or 27-29.

No.	Title	Hour	Day	Bldg.	Instructor
29s§	Advanced Writing—The nature of the writing is left as far as possible to the choice of the students. The instructor will divide the class into several groups according to the types of writing students wish to do (3 cred.; all; prereq. 27)				
	Sec. 1	II	MWF	Ar	Mr. Hessler
	2	IV	MWF	Ar	Miss Atkins
36s	Technical Writing. Consult the Bulletin of the Institute of Technology.				

Senior College Courses

Course 65 is open to Junior College students who have an average grade of at least C in the prerequisite courses.

Courses 67-68, 69-70-71, 81-82-83 are open to Junior College students who have an average of at least B in two quarters of Courses 27-28, 29, 65.

Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

65s	The Writing of Term Papers and Theses (3 cred.; jr., sr.; prereq. A-B-C or 4-5-6 and 6 additional cred. in English, or 10 cred. in Eng. 21-22-23)				
		Ar	Ar	Ar	Mr. Dunn
67f-68w	Problems of Style (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)				
		IV	MWF	304F	Mrs. Phelan
69f-70w-71s	Short Story Writing (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)				
		VIII, IX	W	304F	Mrs. Phelan
81f-82w-83s	Essay Writing (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)				
		II	TTh	304F	Mr. Nichols
91f-92w-93s	Seminar in Writing (9 cred.; sr.; prereq. 9 cred. in Senior College courses and permission of instructor)				
		VII, VIII	Th	304F	Mrs. Phelan

FINE ARTS

Major sequences in the College of Science, Literature, and the Arts.—

A. History of Fine Arts. Courses 51 through 56; two of the three Courses 57, 58, 59; Architecture 51-52-53, 54-55-56; and a comprehensive examination in the history of art.

B. Drawing and Painting. Architecture DP-III; M-II or DP-IV; 9 credits from Courses 51 through 56, and 5 credits chosen from Philosophy 103, History 50-51-52, 53-54-55, 56-57-58, 59-60-61.

(Prerequisites to both sequences: Courses 1, 2, 3; Architecture DP-I for sequence A; Architecture DP-I and DP-II for sequence B; and either History 1-2 or History 11-12-13.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	History of Architecture to 1870 (3 cred.; all; no prereq.)				
		III	TThS	JAud	Mr. Robb
2w	History of Modern Architecture and Sculpture (3 cred.; all; no prereq.)				
		III	TThS	JAud	Mr. Robb
3s	History of Painting (3 cred.; all; no prereq.)				
		III	TThS	JAud	Mr. Robb

§ To receive credit for any part of this course a student must complete 27-28 or 27-29.

Senior College Courses

Courses 51, 52, 53, 54, 55, 56, 57, 58, 59 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

No.	Title	Hour	Day	Bldg.	Instructor
51	*Ancient Art* (3 cred.; jr., sr.; prereq. 1 and 2 and 10 cred. in approved courses in history or literature, or permission of instructor) *(Not offered)*				
53	*The Art of the Fourteenth and Fifteenth Centuries* (3 cred.; jr., sr.; prereq 3 and 10 cred. in history or literature or permission of instructor) *(Not offered)*				
54f	The Art of the Renaissance (3 cred.; jr., sr.; prereq. as for 53)	VI	MWF	2J	Mr. Schmeckebier
55w	Baroque Art (3 cred.; jr., sr.; prereq. as for 53)	VI	MWF	2J	Mr. Schmeckebier
56s	Modern Art (3 cred.; jr., sr.; prereq. as for 53)	VI	MWF	2J	Mr. Schmeckebier
57f	American Architecture (3 cred.; jr., sr.; prereq. 1, 2 and Hist. 20-21-22, or permission of instructor)	II	MWF	2J	Mr. Robb
58w	American Sculpture and Painting (3 cred.; jr., sr.; prereq. 2, 3 and Hist. 20-21-22, or permission of instructor)	II	MWF	2J	Mr. Robb
59s	History of the Graphic Arts (3 cred.; jr., sr.; prereq. 3 and 10 cred. in approved courses in history or literature, or permission of instructor)	II	MWF	2J	Mr. Robb
60f-61w-62s	Tutorial Work (2 cred. per qtr.; students majoring in the department in sequence A only; prereq. permission of instructor)	Ar	Ar	Ar	Mr. Robb
151f	Early Medieval Art—Painting, sculpture, and architecture from the Early Christian through the Byzantine and Pre-Carolingian periods from the third to the ninth centuries (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts or 9 cred. in history with consent of instructor)	IV	MWF	2J	Mr. Schmeckebier
152w	Carolingian and Romanesque Art—The development particularly of painting and sculpture in Europe from the ninth to the thirteenth centuries (3 cred.; jr., sr., grad.; prereq. same as for 151)	IV	MWF	2J	Mr. Schmeckebier
153s	Gothic Art—Painting, sculpture, and architecture of the cathedral period in Europe from the thirteenth to the fifteenth centuries (3 cred.; jr., sr., grad.; prereq. same as for 151)	IV	MWF	2J	Mr. Schmeckebier
160f-161w-162s	Seminar—Special problems in Medieval and Renaissance art (2 or 3 cred.; sr., grad.; prereq. 18 cred. in fine arts and consent of instructor)	Ar	Ar	Ar	Mr. Schmeckebier
163f-164w-165s	Museum Science and Management (3 cred.; sr., grad.; prereq. consent of instructor) (Open only to majors in fine arts)	VII-VIII	MWF	101J	Mr. Schmeckebier, Mrs. Lawrence

See also Architecture 51-52-53, 54-55-56, History of Architecture.

FRENCH

See Romance Languages, page 89.

GEOGRAPHY

Major adviser in the College of Science, Literature, and the Arts.—Professor Davis.

Major sequence in the College of Science, Literature, and the Arts.—Twenty-seven credits from Geography 53, 71, 101, 102, 110, 111, 120, 133, 241, 251, 252, 253; Economics 172, 176; Geology 110; History 80-81-82; Botany 131. At least 20 credits must be in Geography.

(Prerequisites: Courses 11 and 41; Geology 1-2 and A-B, or 1-3 and A-C, or 8; Economics 6-7.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Davis.

Requirements for a teacher's certificate.—Major recommendation: a minimum of 28 credits from the following courses in Geography: 11, 41, 43, 47, 53, 71, 101, 102, 110, 111, 120, 133, 241, 251, 252, 253.

An additional 5 credits from the following courses in Geology: 1-2, 1-3, or 8.

Minor recommendation: 18 credits from the following courses in Geography: 11 or 41, 53, 71, 101, 102, 110, 120.

For a specialized curriculum in social studies, see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
11f*	Human Geography—A study of environmental factors as they limit human activities. Current problems in the use of our natural resources are used as illustrative material (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)				
	Sec. 1	II	MTWThF	103Bu	Mr. Davis
	2	III	MTWThF	103Bu	Mr. Brown
11w*	Human Geography (See 11f)				
	Sec. 1	I	MTWThF	103Bu	Mr. Davis
	2	II	MTWThF	103Bu	Mr. Davis
	3	III	MTWThF	103Bu	Mr. Brown
11s*	Human Geography (See 11f)				
	Sec. 1	II	MTWThF	103Bu	Mr. Davis
	2	III	MTWThF	103Bu	Mr. Brown
	3	VII	MTWThF	103Bu	Mr. Dicken
41f	Geography of Commercial Production—Types of production and their geographic basis. Emphasis on the production of commodities of commercial significance. (5 cred.; soph., jr., sr.; no prereq.; Course 11 recommended)				
	Sec. 1	IV	MTWFS	103Bu	Mr. Dicken
	2	VII	MTWThF	133Ph	Mr. Hartshorne
41w	Geography of Commercial Production (See 41f)				
	Sec. 1	VII	MTWThF	103Bu	Mr. Hartshorne
	2	VI	MTWThF	103Bu	Mr. Dicken
41s	Geography of Commercial Production (See 41f)				
	Sec. 1	VII	MTWThF	150Ph	Mr. Hartshorne
	2	VI	MTWThF	103Bu	Mr. Dicken
43f	Political Geography (5 cred.; soph., jr., sr.; no prereq.)				
		VI	MTWThF	103Bu	Mr. Hartshorne
47f	Geography of Minnesota (3 cred.; soph., jr., sr.; prereq. 11 or 41)				
		VII	MWF	103Bu	Mr. Dicken

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission.

No.	Title	Hour	Day	Bldg.	Instructor
53s	Historical Geography of North America (3 cred.; jr., sr.; prereq. 11, or 15 cred. in history)	I	TThS	103Bu	Mr. Brown
71f	Geography of North America (3 cred.; jr., sr.; prereq. 11)	V	MWF	103Bu	Mr. Dicken
101w	Geography of Europe (3 cred.; jr., sr., grad.; prereq. 8 cred.)	IV	MWF	103Bu	Mr. Hartshorne
102s	Trade Routes and Trade Centers (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	103Bu	Mr. Hartshorne
110f	Geography of South America (3 cred.; jr., sr., grad.; prereq. 8 cred.)	I	TThS	103Bu	Mr. Brown
111	*Cartography and Graphic Representation* (3 cred.; jr., sr., grad.; prereq. 10 cred.) *(Not offered)*				
120s	Geography of Asia (3 cred.; jr., sr., grad.; prereq. 10 cred.)	I	MWF	103Bu	Mr. Davis
133w	Climatology (3 cred.; jr., sr., grad.; prereq. 10 cred. incl. 11)	V	MWF	103Bu	Mr. Brown

Primarily for Graduate Students

241	*Field Course (Not offered)*				
251f	Seminar	Ar	Ar	Ar	Mr. Davis
252w	Seminar	Ar	Ar	Ar	Mr. Davis, and staff
253s	Seminar	Ar	Ar	Ar	Mr. Davis, and staff
301f,w,s	Research Problems	Ar	Ar	Ar	Mr. Davis, Mr. Hartshorne, Mr. Brown, Mr. Dicken

GEOLOGY AND MINERALOGY

Major adviser in the College of Science, Literature, and the Arts.—Associate Professor Thiel.

Major sequences in the College of Science, Literature, and the Arts.—No major sequence in geology should be undertaken without at least two quarters of chemistry. A course in surveying is required, preferably Civil Engineering 17. (See the Bulletin of the Institute of Technology.) Course 23 should be taken as early as possible. One field trip is required of all students majoring in geology.¶

Sequence A. For general geology, federal and state surveys, etc. Courses 91-92-93, 101, 111, 112, 121, (124 and 125) or (144 and 145), 151-152-153. (College physics is required.)

Sequence B. For petroleum geologist. Courses 91-92-93, 101, 105, 112, 119, (144 and 145) or (124 and 125), 151-152-153. (College physics is required.)

Sequence C. For mining geologist and mineralographer. Courses 111, 112, 113, 119, 121, 124, 125, 144, 145, 166-167. (College physics is required.)

Sequence D. For paleontologist. Courses 91-92-93, 101, 103-104, 105, 106, 151-152-153. (Should include general zoology.)

Sequence E. For mineralogist. Courses 61, 105, 106, 111, 119, 121, 131-132, 166-167. (College physics is required.)

Sequence F. For petrographer. Courses 105, 106, (111 and 112) or (124 and 125), 131-132, 140-141. (Trigonometry is required.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

¶ Girls may take trip only when there are enough for a separate section. They should consult the major adviser.

Major adviser in the College of Education.—Associate Professor Thiel.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

For a specialized curriculum in Geophysics see the Bulletin of the Institute of Technology.

Junior College Courses

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.

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w*†	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 (6 cred.; all; no prereq.)				
	Lect.	II	TThS	210P	Mr. Thiel
	Rec.	II	F	210P	Mr. Thiel
Af‡-Bw‡§	General Geology Laboratory (Dynamic and Historical) (4 cred.; all; with or after 1-2)				
	Schedule for Af Sec. 1	I, II	MW	220P	Ar
	2	VI, VII	MW	220P	Ar
	Schedule for Bw Sec. 1	I, II	MW	220P	Ar
	2	VI, VII	TTh	220P	Ar
1f-3w*†	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 (6 cred.; all; no prereq.)				
	Lect.	III	TThS	110P	Mr. Emmons
	Rec.	III	F	110P	Mr. Emmons
Af‡-Cw‡§	General Geology Laboratory (Dynamic and Economic) (4 cred.; all; with or after 1-3)				
		III, IV	MW	220P	Ar
1w-2s*†	General Geology (Dynamic and Historical) (See 1f-2w)				
	Lect.	IV	MWF	110P	Ar
	Rec.	IV	T	110P	Ar
Aw‡-Bs‡§	General Geology Laboratory (Dynamic and Historical) (See Af-Bw)				
		VI, VII	WF	220P	Ar
1w-3s*†	General Geology (Dynamic and Economic) (See 1f-3w)				
	Lect.	II	MWF	110P	Ar
	Rec.	II	S	110P	Ar
Aw‡-Cs‡§	General Geology Laboratory (Dynamic and Economic) (See Af-Cw)				
		I, II	TTh	216P	Ar
1s*	General Geology (Dynamic) (1st qtr. of 1-2 or 1-3. See 1f-2w or 1f-3w)				
	Sec. 1 Lect.	III	MWF	110P	Mr. Thiel
	Rec.	III	Th	110P	
	2 Lect.	VII	MWF	110P	Ar
	Rec.	VIII	M	110P	Ar
As‡§	General Geology Laboratory (Dynamic) (1st qtr. of A-B or A-C. See Af-Bw or Af-Cw)				
	Sec. 1	III, IV	TS	220P	Ar
	2	VIII, IX	WF	220P	Ar
2f*	General Geology (Historical) (2nd qtr. of 1-2. See 1f-2w)				
	Lect.	III	MWF	208P	Mr. Hanley
	Rec.	III	Th	208P	
Bf‡§	General Geology Laboratory (Historical) (2nd qtr. of A-B. See Af-Bw)				
	Lab.	III, IV	TS	216P	Ar
4s	Geology of Minnesota (5 cred.; all; prereq. 1 or 8 and consent of instructor)				
		IV	MTWFS	210P	Mr. Thiel

* For a three-quarter sequence, Course 2 may be followed by Course 3 or 4 and Course 3 by Course 2 or 4.

† To receive credit for any part of this course a student must complete the parts preceding the dagger, except that students in Forestry may take 1 and A for 5 credits without completing 2 and B.

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

§ Course A-B or Course A-C must be completed if geology is offered as the required laboratory science.

No.	Title	Hour	Day	Bldg.	Instructor
8f‖	Introductory Geology—A short introductory course as an elective. Principles of earth sculpture; topographic changes and their causative agents; dynamic, structural, and historic geology (5 cred.; all; no prereq.)				
	Sec. 1	I	MTWThF	210P	Ar
	2	VII	MTWThF	210P	Mr. Thiel
8w‖	Introductory Geology (See 8f)				
		IV	MTWFS	210P	Mr. Thiel
8s‖	Introductory Geology (See 8f)				
	Sec. 1	II	MTWThF	210P	Mr. Thiel
	2	VI	MTWThF	210P	Ar
23f‡-24w†‡	Elements of Mineralogy (8 cred.; soph., jr., sr.: prereq. a course in chemistry)				
	Schedule for 23f Lect.	I	TThS	208P	Mr. Gruner
	Rec.	IV	W	208P	
	Lab. Sec. A	III, IV	TS	100P	
	Sec. B	VI, VII	TTh	100P	
	Schedule for 24w Lect.	I	TThS	208P	Mr. Gruner
	Rec.	VIII	M	208P	
	Lab. Sec. A	III, IV	TS	100P	
	Sec. B	VI, VII	MW	100P	

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51f	Elements of Paleontology (5 cred.; jr., sr.; prereq. 1 and Zool. 1-2-3)				
	Lect.	II	MWF	208P	Mr. Stauffer
	Lab.	I, II	ThS	105P	
61f	Blowpipe Analysis (3 cred.; jr., sr.; prereq. 24)				
	Lect.	II	TThS	100P	Mr. Gruner
	Lab.	VII-VIII	F	100P	
		IX	Th	100P	
85	Field Work in Northern Minnesota—July 15-30, approximately. Students interested in this field trip should consult the department (4 cred.; jr., sr.; prereq. 2, 3, or 51)				
		Ar	Ar	Ar	Mr. Gruner, Mr. Thiel
91f-92w-93s	Index Fossils of North America (9 cred.; jr., sr.; prereq. 2, 3, or 51)				
	Schedule for 91f Lect.	VI	F	208P	Mr. Stauffer
	Schedule for 92w and 93s Lect.	I	F	208P	Mr. Stauffer
	Lab.	VI, VII	MW	105P	
101f-102w	Sedimentation (6 cred.; jr., sr., grad.; prereq. 24)				
	Schedule for 101f Lect.	VIII	MW	210P	Mr. Thiel
		IX	F	210P	
	Schedule for 102w Lect.	VI	T	210P	Mr. Thiel
	Lab.	VII, VIII	TTh	21 P	
103w-104s	Micropaleontology (6 cred.; jr., sr., grad.; prereq. 51 or 91)				
		II, III	TThS	103P	Mr. Stauffer
105s	Rock Study (3 cred.; jr., sr., grad.; prereq. 24)				
	Lect.	I	TS	210P	Mr. Grout
	Lab.	I-II	Th	200P	
106f	Petrography (3 cred.; jr., sr., grad.; prereq. 105)				
	Sec. 1	I, II	Th	200P	Mr. Grout
		VI, VII	M	200P	
	2	VI-VII	TW	200P	Mr. Grout
107f-108w-109s	Paleontologic Practice (9 cred.; jr., sr., grad.; prereq. 91-92-93)				
		Ar	Ar	105P	Mr. Stauffer
110f	Economic Geology (3 cred.; jr., sr., grad.; prereq. 24)				
		I	TThS	110P	Mr. Schwartz

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

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

‖ Not open to students who have had Course 1. Does not satisfy the Junior College requirement for science. Cannot be followed by Course 1 for credit. May be followed by Course 2 with instructor's permission.

No.	Title	Hour	Day	Bldg.	Instructor
111w	Ore Deposits (3 cred.; sr., grad.; prereq. 2, 3, or 51, and 105)	I	TThS	110P	Mr. Emmons
112s	Geology of Petroleum (3 cred.; sr., grad.; prereq. 111)	I	TThS	110P	Mr. Emmons
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. (3 cred.; jr., sr., grad.; prereq. 2 or 3 or 13. Geol. 145w is recommended as a desirable companion course)	III	MWF	206P	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.; jr., sr., grad.; prereq. 2 or 3 or 13)	II	TThS	206P	Mr. Hanley
120	*Glacial Geology*—Nature and process of glacial action. Land forms resulting from alpine and continental glaciers. Characters and distribution of Pleistocene and earlier glacial deposits. (3 cred.; jr., sr., grad.; prereq. 2 or 3 or 13) *(Not offered)*				
121f	Crystallography (3 cred.; jr., sr.; prereq. Math. 7 and Inorg. Chem. 6-7-8 or 9-10)	Ar	Ar	100P	Mr. Gruner
124w	Metamorphic Geology (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)	II	MWF	206P	Mr. Schwartz
125s	Structural Geology (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)	II	MWF	206P	Mr. Schwartz
131w-132s	Advanced Petrology (8 cred.; jr., sr., grad.; prereq. 106)				
	Schedule for 131w Lect.	III	TThS	200P	Mr. Grout
	Rec.	VI	M	200P	
	Lab.	VI, VII	ThF	200P	
	Schedule for 132s Lect.	III	TThS	200P	Mr. Grout
	Rec.	VI	M	200P	
	Lab.	VI, VII	ThF	200P	
137f	Testing Economic Minerals (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)				
	Lect.	Ar	Ar	200P	Mr. Gruner
	Lab.	Ar	Ar	200P	
140w-141s	Applied Petrography (6 cred.; jr., sr., grad.; prereq. 131)				
	Schedule for 140w Lect.	II	F	200P	Mr. Grout
	Lab.	I, II	MW	Ar	
	Schedule for 141s 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.; jr., sr., grad.; prereq. 105)	VI,VII,VIII,IX	WF	206P	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. (2 cred.; jr., sr., grad.; prereq. 2 or 3 or 13)	VI,VII,VIII,IX	W	206P	Mr. Hanley
149s	Methods of Field Geology (No cred.; jr., sr., grad.; to be taken with 150; prereq. 2, 23-24, 106, 124-125)	Ar	Ar	Ar	Mr. Schwartz
150s*	Field Geology (Black Hills)—September 1-28, approximately (jr., sr., grad.)	Ar	Ar	Ar	Mr. Schwartz
151f-152w-153s	Advanced General Geology (9 cred.; jr., sr., grad.; prereq. 2, 3, or 51)	III	MWF	210P	Mr. Stauffer
161w	Crystal Structure (3 cred.; jr., sr., grad.; prereq. 121, elem. phys. and anal. geom.)	Ar	Ar	Ar	Mr. Gruner
166f,w-167w,s	Mineralography (6 cred.; sr., grad.; prereq. 111, 131)	Ar	Ar	207P	Mr. Schwartz
170f,w,s	Geologic Problems (3 cred.; jr., sr., grad.; prereq. permission of major adviser)	Ar	Ar	Ar	Ar

* A maximum of 8 credits will be granted after field report is completed. The course will not be given for fewer than six students.

GEOPHYSICS

See Physics, page 75.

GERMAN

Major adviser in the College of Science, Literature, and the Arts.—Professor Burkhard.

Major sequence in the College of Science, Literature, and the Arts.—Eighteen credits from Group A or Group B, and 15 additional credits in courses numbered above 50.

A. Courses 50-51-52, 53-54-55, 56-57, 58, 70, 80.

B. Courses 61, 62, 63, 64, 65, 68, 70, 77.

Major adviser in the College of Education.—Professor Burkhard.

Requirements for a teacher's certificate.—Major recommendation: Courses 50-51-52, 53-54-55, 56-57, 58, 68, and 15 additional credits in courses numbered above 40.

Minor recommendations.—Courses 50-51-52, 58, and 8 additional credits in courses numbered above 40.

Sequences of courses for academic students.—Without entrance German: Courses 1, 2, 3, 4, other courses numbered 40 or above. With one year of entrance German: Courses 2, 3, 4, other courses numbered 40 or above. With two years of entrance German: Courses 3, 4, other courses numbered 40 or above. With three years of entrance German: Course 4 and other courses numbered 40 or above. With four years of German: Courses numbered 40 or above.

Sequence of courses for premedical students.—Without entrance German: Courses 1, 2, 3, and 30-31-32 or 33-34. With one year of entrance German: Courses 2, 3, and 30-31-32 or 33-34. With two years of entrance German: Courses 3, and 30-31-32 or 33-34. With three years of entrance German: Courses 30-31-32 or 33-34.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Beginning A (5 cred.; all; no prereq.)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
1w	Beginning A (See 1f)				
		I	MTWThF	205F	Ar
		II	MTWThF	209F	Ar
1s	Beginning A (See 1f)				
		II	MTWThF	101F	Ar
		VI	MTWThF	209½F	Ar
2f	Beginning B (5 cred.; all; prereq. 1 or one year of high school German)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
2w	Beginning B (See 2f)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
2s	Beginning B (See 2f)				
		I	MTWThF	205F	Ar
		II	MTWThF	209F	Ar

No.	Title	Hour	Day	Bldg.	Instructor
3f§	Beginning C (5 cred.; all; prereq. 2 or two years of high school German)				
		I	MTWThF	213F	Ar
		VII	MTWThF	209F	Ar
	(Premed. students only)§	II	MTWThF	209½F	Ar
	(Premed. students only)§	IV	MTWFS	209½F	Ar
3w	Beginning C (See 3f)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
3s	Beginning C (See 3f)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
4f	Intermediate German (5 cred.; all; prereq. 3 or three years of high school German)				
		II	MTWThF	212F	Ar
		III	MTWThF	212F	Ar
4w	Intermediate German (See 4f)				
		I	MTWThF	213F	Ar
		VII	MTWThF	209F	Ar
4s	Intermediate German (See 4f)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
24f-25w-26s†	Chemical German (9 cred.; chemists, pharmacists, miners; no prereq.)				
		IV	MWF	113F	Ar
		V	MWF	207F	Ar
27f-28w-29s†	Chemical Prose (9 cred.; chemists, pharmacists, miners; prereq. two years of high school German or one year of college German)				
		IV	MWF	209F	Ar
30f-31w-32s	Medical German (9 cred.; premed.; prereq. 3)				
		II	MWF	207F	Ar
		IV	MWF	213F	Ar
33w-34s	Medical German (10 cred.; premed.; prereq. 3)				
		II	MTWThF	209½F	Ar
		IV	MTWFS	209½F	Ar
40f	Rapid Reading (3 cred.; all; prereq. 4, or four years of high school German)				
		II	MWF	227F	Mr. Downs
40w	Rapid Reading (See 40f)				
		II	MWF	212F	Mr. Downs
40s	Rapid Reading (See 40f)				
		VII	MWF	209½F	Mr. Downs

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50f-51w-52s†	Composition (6 cred.; jr., sr.; prereq. 4)				
		IV	TS	209F	Mr. Holske
53f-54w-55s†	Conversation (3 cred.; jr., sr.; prereq. 52)				
		I	TTh	207F	Mr. Holske
56f-57w†	Essay Writing (6 cred.; jr., sr.; prereq. 52)				
		III	TThS	207F	Mr. Pfeiffer
58s	German Pronunciation (2 cred.; jr., sr.; prereq. 4)				
		III	TTh	207F	Ar
61s	Epics and Ballads (3 cred.; jr., sr.; prereq. 40 or 3 cred. above 60)				
		III	TThS	209F	Mr. Holske

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

§ For premedical students the winter quarter continuation of 3f is 33w.

No.	Title	Hour	Day	Bldg.	Instructor
62s	Nineteenth-Century Prose (3 cred.; jr., sr.; prereq. 40 or 3 cred. above 60)	II	MWF	212F	Mr. Pfeiffer
63f	Classic Drama (3 or 5* cred.; jr., sr.; prereq. 40, or 4 with a grade of B)	IV	MWF	207F	Mr. Meessen
		or			
		IV	MTWFS	207F	
64w	Ninteenth-Century Drama (3 or 5* cred.; jr., sr.; prereq. 40, or 3 cred. above 60)	IV	MWF	207F	Mr. Meessen
		or			
		IV	MTWFS	207F	
65s	Modern Drama (3 or 5* cred.; jr., sr.; prereq. 40, or 3 cred. above 60)	IV	MWF	207F	Mr. Meessen
		or			
		IV	MTWFS	207F	
68w	Survey of German Literature (3 cred.; jr., sr.; prereq. 6 cred. above 40)	III	MWF	209½F	Mr. Burkhard
70f	Early German Literature (3 cred.; jr., sr.; prereq. 6 cred. above 40)	III	MWF	207F	Mr. Munro
77s	Faust I (3 cred.; jr., sr.; prereq. 64 and 3 additional cred. above 60)	III	MWF	209½F	Mr. Burkhard
80w	History of the German Language (3 cred.; jr., sr.; prereq. 6 cred. above 60)	VI	MWF	209F	Mr. Downs
110-111-112	*Introduction to Germanic Philology* (9 cred.; sr., grad.; prereq. 68 and 6 cred. above 60) *(Not offered)*				
115-116-117	*Middle High German Literature* (9 cred.; sr., grad.; prereq. 120 and 11 cred. above 60) *(Not offered)*				
118w	Germanic Heroic Poetry (3 cred.; sr., grad.; prereq. 68 and 9 cred. above 60)	III	TThS	212F	Mr. Reichardt
120f-121w-122s†	Proseminar. History of German Literature (9 cred.; sr., grad.; prereq. 68 and 9 cred. above 60)	II	TThS	207F	Mr. Reichardt, Mr. Holske, Mr. Pfeiffer
140-141-142	*Early High German Literature, 1500-1700* (9 cred.; sr., grad.; prereq. 121 and 11 cred. above 60) *(Not offered)*				
143f-144w-145s†	The Classical Period: Schiller (9 cred.; sr., grad.; prereq. 121 and 11 cred. above 60)	Ar	Ar	Ar	Mr. Holske
150f-151w-152s†	Die Novelle (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 60)	VIII, IX, X	T	301Lib	Mr. Burkhard
153-154-155	*Nineteenth-Century Drama: Kleist, Grillparzer, Hebbel* (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 60) *(Not offered)*				
160-161-162	*Lyric Poetry* (9 cred.; sr., grad.; prereq. 68 and 11 cred. above 60) *(Not offered)*				
163-164-165	*German and English Literary Relations, 16th, 17th, 18th Centuries* (9 cred.; sr., grad.; prereq. 68 and 11 cred. above 60) *(Not offered)*				
173-174-175	*The Modern Novel, 1890-1930* (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 60) *(Not offered)*				
180f-181w-182s	The Romantic School in Germany (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 60)	VIII, IX, X	F	328Lib	Mr. Pfeiffer
192f	Gothic—Introduction to Germanic linguistics (Identical with Scandinavian 192) (4 cred.; sr., with completed major sequence, grad.)	VI	MWThF	209½F	Mr. Reichardt
193w	Gothic Texts (2 cred.; sr., grad.; prereq. 192)	VII, VIII	M	207F	Mr. Reichardt
194s	Old Saxon (3 cred.; sr., grad.; prereq. 192)	VI	MWF	209F	Mr. Reichardt

* Courses 63, 64, 65 may be taken as 5-credit courses only by students who have an average of B in preceding German courses.

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

No.	Title	Hour	Day	Bldg.	Instructor
195w	Introduction to Old Norse Language and Literature (Identical with Scandinavian 195) (4 cred.; sr., grad.; prereq. 192)	VI	MWThF	209½F	Mr. Reichardt
196s	Eddic Poetry (Identical with Scandinavian 196) (3 cred.; sr., grad.; prereq. 195)	VII	MWF	209F	Mr. Reichardt
209-210-211	*Old High German* (9 cred.; sr., with completed major sequence, grad.) *(Not offered)*				
215f-216w-217s	Seminar: Middle High German Texts (9 cred.; grad.)	Ar	Ar	Ar	Mr. Reichardt

GREEK

See Classics, page 36.

HISTORY

Major advisers in the College of Science, Literature, and the Arts.—Professor Shippee; Associate Professors Osgood and Steefel.

Major sequence in the College of Science, Literature, and the Arts.—Students will take the equivalent of at least two nine-credit courses numbered from 50 to 100. These will normally come in the junior year. In the senior year students, if they have maintained to the end of the junior year an honor point average of 1.5 in all work, will take at least one course numbered 150 or above; all other majors in history will take an additional number of courses with numbers 50 to 100 in the senior year, but will not take courses numbered 150 or above. Normally a history major will consist of Senior College courses aggregating at least 27 credits.

(Prerequisites: Course 1-2-3 (twelve credits) or the old Course 1-2 (ten credits) or 4-5-6, and 20-21-22. For students who have had an acceptable course in American history elsewhere, the requirement of 20-21-22 may be waived upon recommendation of the major adviser.)

Major adviser in the College of Education.—Associate Professor Osgood.

Requirements for a teacher's certificate.—Major recommendation: a minimum of 45 credits; at least 18 credits must be in Senior College courses.

Minor recommendation: a minimum of 18 credits of which at least 9 credits must be in Senior College courses.

No major recommendation to teach history will be given unless the candidate has taken at least the general course in American history, History 20-21-22, or equivalent.

(Prerequisites: Course 1-2-3 (twelve credits) or the old Course 1-2 (ten credits) or 4-5-6, and 20-21-22. For students who have had an acceptable course in American history elsewhere, the requirement of 20-21-22 may be waived upon recommendation of the major adviser.)

Students will take at least two of the courses numbered from 50 to 100. These will normally come in the junior year. In the senior year students, if they have maintained to the end of the junior year an honor point average of 1.5 in all work, will take at least one course numbered above 150; all other majors in history will take an additional number of survey courses in the senior year, but will not take courses numbered above 150.

For a specialized curriculum in social studies see the Bulletin of the College of Education.

Students planning to do advanced work in history should get a reading knowledge of French and German in their early undergraduate years.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s†	European Civilization (12 cred.; all; no prereq.)				
	Lect. Sec. 1	II	TThS	BuAud	Mrs. Tyler
	Reserved for examination purposes	VIII	TTh	(See special footnote§)	
	Rec. Secs.*	I	M	202EdH	
		I	W	202EdH	
		II	M	202EdH	
		II	W	202EdH	
	These recitation sections are for students who take Lecture Section 1.	III	M	202EdH	
		III	W	202EdH	
		IV	M	202EdH	
		IV	W	202EdH	
		VI	M	202EdH	
		VI	W	202EdH	
		VII	M	202EdH	
		VII	W	202EdH	
	Lect. Sec. 2	VII	MWF	BuAud	Mr. Deutsch
	Reserved for examination purposes	VIII	TTh	(See special footnote§)	
	Rec. Secs.*	I	T	202EdH	
		I	Th	202EdH	
		II	T	202EdH	
		II	Th	202EdH	
	These recitation sections are for students who take Lecture Section 2.	III	T	202EdH	
		III	Th	202EdH	
		VI	T	202EdH	
		VI	Th	202EdH	
		VII	T	202EdH	
		VII	Th	202EdH	
1w-2s	European Civilization (2 qtrs. of 1-2-3. Course 3f will be offered in 1940-41) (See 1f-2w-3s)				
	Lect.	II	MWF	206Pt	Mr. Steefel
	Rec. Sec.*	I	T	209EdH	
		I	Th	209EdH	
		II	T	209EdH	
		II	Th	209EdH	
		III	T	209EdH	
		III	Th	209EdH	
		VI	T	209EdH	
		VII	Th	209EdH	
3s	Social and Economic History of Modern Europe (This course has been renumbered 17s)				
4f-5w-6s†	English History—England since prehistoric times (9 cred.; all; no prereq.)				
	Lect.	II	MW	BuAud	Mr. Burt
	Rec. Secs.*	I	F	202EdH	
		II	F	202EdH	
		II	Th	110P	
		III	F	202EdH	
		IV	W	9F	
		VI	F	202EdH	
7-8-9	This course has been renumbered 20-21-22.				
11f-12w-13s†	Medieval History—300-1560 (9 cred.; for music and architecture students only; no prereq.)				
		IV	MWF	221Bu	Miss Thompson

* Recitation sections in Courses 1f, 1w, 4f, 14f, and 17s will not meet until after the first lecture.

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

§ *Special note.*—The class will not meet at VIII TTh but the final examination at the end of each quarter will be given at the time regularly scheduled for VIII TTh classes. Therefore students who take History 1f-2w-3s must not register for any other class which meets at VIII TTh.

No.	Title	Hour	Day	Bldg.	Instructor
14f-15w-16s†	Ancient Civilization (9 cred.; all; no prereq.)				
	Lect.	VII	TTh	BuAud	Mr. Jones
	Rec. Secs.*	VII	W	209EdH	
		VII	F	209EdH	
		I	S	209EdH	
		II	S	209EdH	
17s	Social and Economic History of Modern Europe—Since 1500 (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq. Not open to students who have taken Econ. 1) (Formerly Course 3s)				
	Lect.	II	TThS	206Pt	Mr. Heaton
	Rec. Secs.*	I	MW	208P	
		II	MW	209EdH	
		III	MW	209EdH	
		IV	MW	209EdH	
		VII	TTh	112Bu	
20f-21w-22s†	American History (9 cred.; soph., jr., sr.; no prereq.) (Formerly Course 7-8-9)				
	Sec. 1	I	MWF	209Bu	Mrs. Tyler
	2	I	MWF	111Bu	Mr. Stephenson
	3	VII	MWF	209Bu	Mr. Osgood

Senior College Courses

Except where otherwise stated, there are no prerequisites for the courses numbered 50 to 100. The examination at the end of the course will cover the work of the three terms, and no final grade will be assigned until the whole course is completed. In exceptional cases students may enter the winter quarter, but in that event must read to cover the work of the first quarter.

Course 70-71-72 is open to prelegal sophomores who have completed Course 4-5-6 or Course 1-2-3 or the old Course 1-2 (ten credits) with a grade of at least C, and also to prelegal sophomores who have an average grade of C in all their work, even if that work includes no course in history. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50-51-52†	*Ancient Orient and Greece to 200 B.C.* (9 cred.; jr., sr.) *(Not offered)*				
50af-51aw-52as†	History of Rome and the Byzantine Empire (9 cred.; jr., sr.)				
		I	TThS	112Bu	Mr. Jones
53-54-55†	*Medieval European History—300-1300* (9 cred.; jr., sr.) *(Not offered)*				
53af-54aw-55as†	Renaissance and Reformation—1300-1648 (9 cred.; jr., sr.)				
		III	MWF	112Bu	Miss Thompson
56-57-58†	*Early Modern European History—1648-1815* (9 cred.; jr., sr.) *(Not offered)*				
59f-60w-61s†	Europe in the Nineteenth Century (9 cred.; jr., sr.)				
		IV	MWF	111Bu	Mr. Steefel
62-63-64†	*European Expansion* (9 cred.; jr., sr.) *(Not offered)*				
65w-66s†	Europe in the Twentieth Century (6 cred.; jr., sr.)				
		I	MWF	209EdH	Mr. Deutsch
67w-68s†	United States since Reconstruction (6 cred.; jr., sr.)				
		VII	MWF	221Bu	Mr. Stephenson
70f-71w-72s†	English Constitutional History (9 cred.; open to prelegal soph. with at least a C average in Courses 20-21-22, 1-2-3, or in all their college work, and to all jrs. and srs.)				
		I	MWF	211Bu	Mr. White
73f-74w-75s†	England since 1485 (9 cred.; jr., sr.)				
		II	MWF	111Bu	Mr. Willson
76f-77w-78s†	Canadian History (9 cred.; jr., sr.)				
		III	TThS	221Bu	Mr. Burt

* Recitation sections in Courses 1f, 1w, 4f, 14f, and 17s will not meet until after the first lecture.

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

No.	Title	Hour	Day	Bldg.	Instructor
80f-81w-82s†	Introduction to Economic History (9 cred.; jr., sr.)	I	TThS	111Bu	Mr. Heaton
83-84-85†	*American Economic History* (9 cred.; jr., sr.) *(Not offered)*				
83aw	American Agricultural History (Open only to students in the College of Agriculture, Forestry, and Home Economics) (3 cred.; soph., jr.. sr.; no prereq.)	I	MWF	107PP	Mr. Loehr
86w-87s†	English Backgrounds and American Colonies (6 cred.; jr., sr.)	II	MWF	112Bu	Mr. White
88-89†	*American Colonies in the Seventeenth Century* (6 cred.; jr., sr.) *(Not offered)*				
90f-91w-92s†	West in American History (9 cred.; jr., sr.)	III	TThS	111Bu	Mr. Osgood
90af-91aw-92as†	Minnesota and the Northwest (9 cred.; jr., sr.)	II	TThS	111Bu	Mr. Blegen
93f-94w-95s†	American Diplomatic History (9 cred.; jr., sr.)	III	MWF	221Bu	Mr. Shippee
93a-94a-95a	*Survey of Latin American History* (9 cred.; jr., sr.) *(Not offered)*				

Courses numbered 150 to 200 are open to seniors, and to graduate students upon recommendation of advisers; prerequisites are appropriate lecture courses and consent of the department.

150f-151w-152s†	Selected Readings in Ancient History—Greek Archeology (9 cred.; sr., grad.)	II	TThS	112Bu	Mr. Jones
153f-154w-155s†	Selected Readings in Medieval and Renaissance History (9 cred.; jr., sr., grad.)	VIII, IX	W	328Lib	Miss Thompson
156f-157w-158s†	Selected Readings in Modern European History (9 cred.; sr., grad.)				
	Twentieth-Century Europe	VIII, IX	T	328Lib	Mr. Deutsch
	Eighteenth-Century Europe	VI, VII	Th	301Lib	Mr. Steefel
170f-171w-172s†	Selected Readings in English History (9 cred.; sr., grad.)				
	Topic arranged	VIII, IX	Th	328Lib	Mr. White
	Eighteenth- and Nineteenth-Century England	VIII, IX	Th	301Lib	Mr. Willson
176f-177w-178s†	Selected Readings in Canadian History (9 cred.; sr., grad.)	I, II	Th	219Bu	Mr. Burt
180f-181w-182s†	Selected Readings in Economic History—European economic development before 1700 (9 cred.; sr.. grad.)	VI, VII	T	111Bu	Mr. Heaton
183f-184w-185s†	Selected Readings in American Economic History (9 cred.; sr., grad.)	VIII-IX	T	111Bu	Mr. Loehr
190f-191w-192s†	Selected Readings in American History (9 cred.; sr., grad.)				
	The Slavery Controversy	VI, VII	T	328Lib	Mr. Stephenson
	Civil War and Reconstruction	VI, VII	Th	339Lib	Mrs. Tyler
	West, 1815-1865	VIII, IX	W	339Lib	Mr. Osgood
	The Later Nineteenth Century and After	VIII, IX	F	339Lib	Mr. Shippee
	Social Aspects of American History, with Special Reference to Northwest	VIII, IX	T	Ar	Mr. Blegen

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

HOME ECONOMICS

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

The courses in Home Economics which are listed below are open to students of the College of Science, Literature, and the Arts. Other courses may be taken by arrangement with the department; but before registering for them students should get the approval of Assistant Dean Shumway in 219 Administration Building. The hours and days at which the classes meet are announced in the College of Agriculture, Forestry, and Home Economics section of this bulletin.

Course Numbers, Titles, and Descriptions

2f,s — Introduction to Textiles—Textile fibers and their properties as related to fabric properties; yarn and fabric structure and design; problems in selection of textile materials for clothing and household furnishings. Laboratory work with representative fabrics.

3f,w,s — Clothing Construction A—Laboratory practice in designing and planning, cutting, fitting, and applying suitable techniques in making garments of cotton and silk or rayon fabrics; care and use of sewing machines; interpretation and adaptation of commercial patterns. Construction problems include a child's garment.

4f,w,s — Clothing Construction B—Laboratory practice in costume modeling; preparation of dress form; application of tailored technique to silk, rayon, or wool fabrics; garments constructed include a remodeling problem.

21f,w,s-22f,w,s — Color and Design I, II—The principles of color and design related to selecting and designing costumes and selecting, arranging, and designing house furnishings.

30s — Introduction to Nutrition—Designed for students wishing a discussion of the application of principles of nutrition to selection of food.

34f — Nutrition Problems—Consideration of nutrition problems most commonly met by adults and children in typical families.

40f,w,s — Food Preparation—Development of technique and application of fundamental science principles to cookery processes. Estabishment of good standards for food products.

55f,w,s — Related Art Problems—Problems worked out relating to costume and house furnishing design.

56Af-56Bs — Applications of Color and Design—Principles of design and color applied to selection, cost, and arrangement in fields of costume, dress, and household fabrics and household furnishings.

89s — Home Management with Special Reference to Low Income Families—Management of the home in relation to economic and social status of the family, with special consideration given to the dependent family.

120f,w,s — Art History and Appreciation—Historical development of painting, sculpture, architecture, decoration, furniture, and costumes, with special emphasis on design and influence upon modern styles.

180w,s — Home Planning and Furnishing—A study for the homemaker who aims at more intelligent planning and furnishing of the home. House plans, selection and arrangement of equipment and furnishings from the point of view of beauty and good home management.

HOW TO STUDY

No.	Title	Hour	Day	Bldg.	Instructor
1f§	How To Study (2 cred.; prereq. permission of instructor. See footnote §)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others
	3	VII	MWF	104J	
1w§	How To Study (See 1f)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others
1s§	How To Study (See 1f)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others

§ Registration is limited. Written permission from the instructor is necessary for admission. For Course 1f, students should inquire at 106 Folwell Hall; for Courses 1w and 1s, at 112 Psychology Building.

HUMAN ANATOMY

MEDICAL SCHOOL

For complete list of courses, see the Bulletin of the Medical School.

Students in this college may elect courses in human anatomy other than Course 3 (see the Bulletin of the Medical School) only by arrangement with the head of the Department of Anatomy.

No.	Title	Hour	Day	Bldg.	Instructor
3f,s	Elementary Anatomy (3 cred.; primarily for nurses; all; no prereq.)				
	Lect.	VI	T	Ar	Mr. Blount
	Lab. and rec.	VI, VII, VIII	Th	Ar	

HUMAN PHYSIOLOGY

See Physiology, page 79.

ITALIAN

See Romance Languages, page 89.

JOURNALISM

Major advisers in the College of Science, Literature, and the Arts.—Professors Casey, Barnhart, and Nafziger; Associate Professor Charnley; Assistant Professors Ford and Kildow.

Major sequence in the College of Science, Literature, and the Arts.—Courses 51, 52 (for men), 55, 69 or 73-74, 101 (for men), 109-110, 140-141-142, and 9 additional credits to be chosen in conference with the 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.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

The additional credits will be arranged to prepare students for the following types of journalistic work: (1) metropolitan journalism—news, editorial, advertising, or press association work; (2) small daily and weekly journalism—editing and management; (3) journalism-advertising; (4) magazine writing, magazine editing—editorial direction and business management of trade, technical, and professional journals; (5) radio writing; (6) agricultural journalism—consult the Bulletin of the College of Agriculture, Forestry, and Home Economics; (7) teacher training in journalism—consult the Bulletin of the College of Education.

Freshmen who are interested in journalism or those who think that they may enter the department at a later time are urged to discuss their course programs with members of the journalism staff.

(Prerequisites: Courses 13, 14-15, and Composition 27-28.) In addition to these prerequisites, the following Junior College courses are recommended as providing, in most cases, the best foundation for a major in journalism: Political Science 1-2-3, 7 and 25; Sociology 1 and 6; Psychology 1-2; 9 credits in history; Economics 6-7.

Adviser for students in all colleges.—Professor Casey.

Minor sequence.—For students in the College of Agriculture, Forestry, and Home Economics, the Institute of Technology, and the School of Business Administration: Courses 13, 41, 69, and 6 additional credits in Senior College journalism courses, to be chosen in conference with the adviser. Courses 70, 111, 114, and 110 are recommended.

Minor sequence in the College of Education.—Courses 13, 41, 69, 82, and at least 3 additional credits in Senior College journalism courses.

Course Ed. T. 74 offered by the Department of Journalism and listed under "Methods and Directed Teaching" in the program of the College of Education (in this bulletin) is also required in this sequence.

Note.—Sociology 116 and Agricultural Journalism 50-51-52 and 53 carry credit in the department.

Fees.—Students registered for any journalism course, except Course 5, are required to pay a general fee of $1 a quarter, regardless of the number of courses pursued. Courses 41, 51-52, 55, and 58 require laboratory fees in addition to the equipment fee of $1.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
5s	The American Newspaper—A survey of the history, organization, and methods of contemporary journalism followed by an analysis of the relation of newspapers to their readers (Not open to Journalism majors) (3 cred.; soph. with average of C, jr., sr.; no prereq.)				
		II	TThS	401Jr	Mr. Ford
12w¶	Newspaper Reporting (5 cred.; substantially equivalent to 13, 14; soph, jr., sr. with average of C; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement, and consent of instructor)				
	Lect.	VI	MW	305Jr	Mr. Kildow
	Lab.	VI, VII, VIII	TTh	205Jr	
13f	Introduction to Reporting (for majors) (3 cred.; soph., jr., sr., with average of C; prereq. Eng. A-B-C or Comp. 4-5-6, or exemption from English requirement)				
	Sec. 1	I	MWF	14P	Mr. Charnley,
	2	I	TThS	10P	Mr. Kildow,
	3	I	MWF	10P	Mr. Thackrey
13f	Introduction to Reporting (for minors) (3 cred.; soph., jr., sr. with average of C; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement)				
		I	MWF	305F	Mr. Ford
14w-15s†	Newspaper Reporting (for majors) (6 cred.; soph., jr., sr.; prereq. for 14, C average in 13 and in all work, or consent of instructor, and Comp. 27-28§; for 15, C average in 13-14 or 12 and in all work, or consent of instructor, and Comp. 27-28§)				
	Sec. 1 (winter)	VI, VII, VIII	MW	205Jr	Mr. Charnley,
	2 (winter)	I, II, III	TTh	205Jr	Mr. Thackrey
	Sec. 1 (spring)	VI, VII, VIII	MW	205Jr	Mr. Charnley,
	2 (spring)	I, II, III	TTh	205Jr	Mr. Nafziger,
	3 (spring)	VII, VIII, IX	TTh	205Jr	Mr. Thackrey
41w‡‡	Editing for Nonmajors (Not open to S. L. and A. students) (3 cred.; jr., sr.; prereq. 12 or 13)				
	Lect.	IV	MW	401Jr	Mr. Ford
	Lab. Sec. 1	VIII, IX	T	208Jr	
	2	VI, VII	W	208Jr	
	3	VI, VII	Th	208Jr	

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

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

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

§ May be taken at the same time.

¶ This course is intended only for winter quarter transfer students and others who for exceptional reasons cannot take 13 and 14. It should be followed by 15.

No.	Title	Hour	Day	Bldg.	Instructor
51f‡-52w‡	News Editing (6 cred.; jr., sr.; prereq. 15)				
	Lect.	II	M	14P(f) 305Jr(w)	Mr. Thackrey
	Lab.	Fall quarter			
	Sec. 1	VIII, IX	M	19P	Mr. Kildow
	2	II, III	T	19P	Mr. Kildow
	3	VII, VIII	T	19P	Mr. Thackrey
	4	II, III	Th	19P	Mr. Kildow
	5	VII, VIII	Th	19P	Mr. Thackrey
	6	VI, VII	F	19P	Mr. Nafziger
	Lab.	Winter quarter			
	Sec. 1	VI, VII	M	209Jr	Mr. Nafziger
	2	VIII, IX	T	209Jr	Mr. Thackrey
	3	VIII, IX	W	209Jr	Mr. Kildow
	4	VII, VIII	Th	209Jr	Mr. Thackrey
	5	VI, VII	F	209Jr	Mr. Kildow
	6	III, IV	S	209Jr	Mr. Thackrey
51s‡	News Editing (3 cred.; jr., sr.; prereq. 12 or 14)				
	Lect.	IV	M	305Jr	Mr. Thackrey
	Lab. Sec. 1	VII, VIII	M	209Jr	Mr. Nafziger
	2	II, III	T	209Jr	Mr. Thackrey
	3	VII, VIII	Th	209Jr	Mr. Thackrey
55f,w,s‡‡‡	Advertising and Newspaper Typography (3 cred.; jr., sr.; prereq. 15)				
	Lect.	VII	M	14P(f) 305Jr(w,s)	Mr. Barnhart
	Lab. Sec. 1	VIII, IX	MW	20P(f) 301,302Jr(w,s)	
	2	VI, VII	TTh	20P(f) 301,302Jr(w,s)	
	3	I, II	WF	20P(f) 301,302Jr(w,s)	
	4	VI, VII	WF	20P(f) 301,302Jr(w,s)	
58w‡	Advanced Typography (2 cred.; jr., sr.; prereq. 55 and consent of instructor)				
		Ar	Ar	301,302Jr	Mr. Barnhart
60-61-62	*The Weekly Newspaper* (9 cred.; jr., sr.; prereq. 15) *(Not offered)*				
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	110P	Mr. Barnhart
68s	Problems in Radio Writing (3 cred.; jr., sr.; prereq. 52 for men, 51 for women, and consent of instructor)				
		VI	MWF	306Jr	Mr. Charnley
69s	Newspaper and Magazine Articles (3 cred.; jr., sr.; prereq. 15 or 41)				
		I	MWF	305Jr	Mr. Kildow
70s	Business and Specialized Journalism (3 cred.; jr., sr.; prereq. 15 or 69, or consent of instructor)				
		II	TThS	306Jr	Ar
73f-74w	Magazine Writing and Editing (6 cred.; jr., sr.; prereq. for 73, 15; for 74, 73 and consent of instructor)				
		VI	MWF	10P(f) 304Jr(w)	Mr. Charnley
75s	Law of the Press (2 cred.; jr., sr.; open only to major students in journalism who have not taken Course 15 here; prereq. 51-52)				
		IV	MW	306Jr	Mr. Charnley
76f	Critical Writing (3 cred.; jr., sr.; prereq. 15)				
		II	TThS	10P	Mr. Ford
78s	Press Relations (3 cred.; jr., sr.; prereq. 69 or 73)				
		II	MWF	304Jr	Mr. Thackrey
82s	Supervision of School Publications (3 cred.; jr., sr.; prereq. 41 or 51-52)				
		IV	MWF	401Jr	Mr. Kildow

* This course 65f is one of the three related courses of special interest to students of journalism and advertising. The other two, listed elsewhere in this bulletin, are Drawing 64w, "Graphic Arts" and Business Administration 194s, "Advanced Advertising Procedure."

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

‡‡‡ A fee of $3 is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
93f§	Daily and Weekly Editorial Administration (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	14P	Mr. Barnhart
94w§	Daily and Weekly Newspaper Advertising (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	304Jr	Mr. Barnhart
95s§	Daily and Weekly Circulation and Newspaper Management (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	304Jr	Mr. Barnhart
96	*The Journalism of Finance and Commerce* (3 cred.; jr., sr.; prereq. 15 and 10 cred. in economics or business administration) *(Not offered)*				
99f,w,s	Readings in Journalism (Cred. ar., not to exceed 3; jr., sr.; prereq. consent of the chairman of the department)				Staff
101w	The Reporting of Public Affairs (3 cred.; jr., sr., grad.; prereq. 51-52 and 9 cred. in political science)	III	TThS	304Jr	Mr. Nafziger
103s	Literary Aspects of Journalism (3 cred.; jr., sr., grad.; prereq. Eng. 21-22 or 22-23)	IV	MWF	304Jr	Mr. Ford
104s	Advanced Newspaper Advertising (2 cred.; jr., sr., grad.; prereq. 52, 94, and consent of instructor)	VIII	TTh	401Jr	Mr. Barnhart
109w-110s	History of Journalism (6 cred.; jr., sr., grad.; prereq. 15)				
	Lect.	III	MW	125Jr	Mr. Ford
	Rec. Sec. 1	III	Th	401Jr	
	2	III	F	401Jr	
111f	Foreign News Sources (3 cred.; jr., sr., grad.; prereq. 41 or 51 and a history or political science course in international relations, or consent of instructor)	III	MWF	10P	Mr. Nafziger
112	*Current Newspaper Problems* (3 cred.; jr., sr., grad.; prereq. 109-110 or 111) *(Not offered)*				
114w	The Influence of the Newspaper (3 cred.; jr., sr., grad.; prereq. 15 or 41)	II	TThS	208Jr	Mr. Ford
130f-131w†-132s	The Press and Public Opinion (9 cred.; jr., sr., grad.; prereq. 15 cred. in the social studies and psychology)	II	MWF	10P(f) 304Jr(w,s)	Mr. Casey
140f-141w-142s†	Contemporary Affairs (9 cred.; sr., grad.; prereq. 109-110 and 20 cred. in social science)				
	Lect.	VI	TTh	14P(f) 125Jr(w,s)	Mr. Casey, Mr. Nafziger, Mr. Charnley, Mr. Thackrey
	Rec. Sec. 1	IV	T	14P(f) 304Jr(w,s)	Mr. Nafziger
	2	VII	T	14P(f) 304Jr(w,s)	Mr. Charnley
	3	IV	T	10P(f) 306Jr(w,s)	Mr. Thackrey

For Graduate Students Only

205f,w,s	Topics in International News Communications (3 cred.; seminar for grad. students; prereq. consent of chairman of department)	Ar	Ar	10P(f) 405Jr(w,s)	Mr. Nafziger
210f,w,s	Research in Newspaper Problems (2 cred.; seminar course for grad. students; prereq. consent of department)	Ar	Ar	10P(f) 405Jr(w,s)	Mr. Casey

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

§ Two quarters of Courses 93, 94, 95 must be completed before credit is received for any quarter.

LATIN

See Classics, page 36.

LIBRARY METHODS

Note.—For the special course in library training see the Bulletin of the College of Science, Literature, and the Arts. For professional courses in library instruction see the program of the Division of Library Instruction, pages 9-10.

No.	Title	Hour	Day	Bldg.	Instructor
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.)				
	Sec. 1	II	MW	3Lib	Mr. Russell, Miss Moen
	2	IV	MW	3Lib	Mr. Shove, Miss Bennett
	3	VI	MW	5Lib	Miss Davenport

MATHEMATICS

Major advisers in the College of Science, Literature, and the Arts.—Professors Brink and Jackson.

Major sequence in the College of Science, Literature, and the Arts.—Courses 50, 51, 105, 62; and either 15 additional credits in Senior College courses, other than 70, or 6 additional credits in Senior College courses, other than 70, together with 10 credits of Physics 101-103-105 or 9 credits of Biostatistics (Preventive Medicine and Public Health 110, 120, 130, 140).

(Prerequisites: Mathematics 6, 7, 30.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Associate Professor Underhill.

Requirements for a teacher's certificate.—Major recommendation: entrance credit in solid geometry or its equivalent; Courses 6, 7, 30, 50, 51, and 8 additional credits in courses numbered above 51.

Minor recommendation: entrance credit in solid geometry or its equivalent. Course 50 and 3 additional credits in courses numbered above 50.

Mathematics 20 is strongly recommended as an elective, to be taken preferably in the freshman or sophomore year, in connection with either a major or minor recommendation.

Placement tests.—In each of Courses 1, 6, and 8, 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 or 8, 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 or 8.

§ For students in the College of Science, Literature, and the Arts. Others must obtain a special card from the Junior College office, 106 Folwell Hall.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f*	Higher Algebra (5 cred.; all; prereq. one yr. of elementary algebra§; open for credit to any student offering less than one year of high school higher algebra for entrance)				
	Sec. 1	I	MTWThF	JAud	Ar
	2	III	MTWThF	105F	Ar
	3	VI	MTWThF	105F	Ar

In choosing one of the sections of this course the student should be guided by the schedule of hours for its winter quarter continuation. The fall-winter sequences are: At I hour, 1f-6w and 1f-8w; at III hour, 1f-6w; at VI hour, 1f-6w.

1w*	Higher Algebra (See 1f)				
	Sec. 1	IV	MTWFS	104F	Ar
	2	VI	MTWThF	105F	Ar

In choosing one of the sections of this course the student should be guided by the schedule of hours for its spring quarter continuations. The winter-spring sequences are: At IV hour, 1w-6s; at VI hour, 1w-6s and 1w-8s.

1s*	Higher Algebra (See 1f)				
		I	MTWThF	301F	Ar
6f	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)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar
6w	Trigonometry (See 6f)				
	Sec. 1	I	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar
	3	VI	MTWThF	104F	Ar
6s	Trigonometry (See 6f)				
	Sec. 1	IV	MTWFS	104F	Ar
	2	VI	MTWThF	105F	Ar
7f¶	College Algebra (5 cred.; all; prereq. 6, or high school trigonometry if approved by the department chairman)				
		I	MTWThF	105F	Miss Carlson
7w¶	College Algebra (See 7f)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	105F	Ar
7s¶	College Algebra (See 7f)				
		III	MTWThF	101F	Ar
8f*¶	Commerce Algebra (5 cred.; prebus. stud.*; prereq. 1, or high school higher algebra§)				
		VII	MTWThF	JAud	Ar
8w*¶	Commerce Algebra (See 8f)	I	MTWThF	JAud	Ar
8s*¶	Commerce Algebra (See 8f)	VI	MTWThF	104F	Ar
20w*	Mathematics of Investment (5 cred.; all; prereq. 8, or 6 and 7)				
		VII	MTWThF	JAud	Ar
20s*	Mathematics of Investment (See 20w)				
		I	MTWThF	JAud	Ar
21s	Introduction to the Mathematics of Life Insurance (3 cred.; all; prereq. 20)				
		VII	MWF	104F	Miss Gibbens
30f	Analytic Geometry (5 cred.; all; prereq. 6 and 7 or 6 and 8)				
		I	MTWThF	104F	Mr. Underhill
30w	Analytic Geometry (See 30f)	I	MTWThF	104F	Miss Carlson
30s	Analytic Geometry (See 30f)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar

Senior College Courses

Courses 50, 51, 105 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

* Prebusiness students who elect mathematics to meet the requirement of 10 credits in mathematics or laboratory science, should take 1 and 8 if they have not had high school higher algebra, and 8 and 20 if they have had high school higher algebra.

§ Read the announcement about placement tests which precedes the heading Junior College Courses.

¶ No student may receive credit for both Courses 7 and 8.

No.	Title	Hour	Day	Bldg.	Instructor
50f	Calculus I (5 cred.; jr., sr.; prereq. 30)	III	MTWThF	101F	Mr. Brink
50w	Calculus I (See 50f)	I	MTWThF	102F	Mr. Underhill
50s	Calculus I (See 50f)	I	MTWThF	105F	Miss Carlson
51w	Calculus II (5 cred.; jr., sr.; prereq. 50)	III	MTWThF	101F	Mr. Brink
51s	Calculus II (See 51w)	I	MTWThF	102F	Mr. Underhill
52	This course has been renumbered 105				
60s	Synthetic Metric Geometry (3 cred.; jr., sr.; prereq. 30)	II	MWF	103F	Miss Carlson
62w	Introduction to the Theory of Equations (3 cred.; jr., sr.; prereq. 50)	VII	MWF	104F	Mr. Bussey
63	This course has been renumbered 137				
70	*History of Elementary Mathematics* (3 cred.; jr., sr.; prereq. 30) *(Not offered)*				
102-103	*Advanced Analytic Geometry* (6 cred.; jr., sr., grad.; prereq. 51) *(Not offered)*				
105f	Intermediate Calculus (Formerly Course 52) (5 cred.; jr., sr., grad.; prereq. 51)	II	MTWThF	101F	Mr. Underhill
105s	Intermediate Calculus (See 105f)	III	MTWThF	102F	Mr. Brink
106f	Differential Equations (3 cred.; jr., sr., grad.; prereq. 51)	IV	MWF	105F	Miss Gibbens
107w-108s	Advanced Calculus (6 cred.; jr., sr., grad.; prereq. 105)	IV	MWF	105F	Mr. Underhill
109f	Theory of Numbers (3 cred.; jr., sr., grad.; prereq. 51)	II	MWF	104F	Mr. Bussey
115w	Differential Geometry (3 cred.; jr., sr., grad.; prereq. 136)	II	MWF	104F	Miss Gibbens
118-119-120	*Vectors and Matrices* (9 cred.; jr., sr., grad.; prereq. 51) *(Not offered)*				
121-122-123	*Mathematical Theory of Statistics* (9 cred.; jr., sr., grad.; prereq. 51) *(Not offered)*				
131	*Advanced Algebraic Theory* (3 cred.; jr., sr., grad.; prereq. 62 or 105) *(Not offered)*				
136f	Solid Analytic Geometry (3 cred.; jr., sr., grad.; prereq. 51)	VII	MWF	105F	Mr. Underhill
137s	Advanced Theory of Equations (3 cred.; jr., sr., grad.; prereq. 51, 62) (Formerly Course 63)	VII	MWF	105F	Mr. Bussey
140	*Projective Geometry* (3 cred.; jr., sr., grad.; prereq. 136) *(Not offered)*				
142	*Theory of Invariants* (3 cred.; jr., sr., grad.; prereq. 131 or 137) *(Not offered)*				
144f-145w-146s	Topics in Analysis (9 cred.; jr., sr., grad.; prereq. 51)	VIII	MTF	105F	Mr. Jackson
149s	Introduction to Group Theory (3 cred.; jr., sr., grad.; prereq. 51, 62)	II	MWF	104F	Mr. Campaigne

For Graduate Students Only

206f-207w-208s	Theory of Functions (9 cred.; grad.; prereq. 108)	II	TThS	104F	Mr. Brink
209f-210w-211s	Modern Theories of Analysis in Abstract Spaces (9 cred.; grad.; prereq. 208)	Ar	Ar	Ar	Mr. Arnold
245f-246w-247s	Advanced Theory of Functions (9 cred.; grad.; prereq. 208)	Ar	Ar	Ar	Mr. Jackson

NOTE.—Some of the courses listed in the Graduate School Bulletin are open to properly qualified juniors and seniors. For further information consult the chairman of the Department of Mathematics.

MILITARY SCIENCE AND TACTICS

See the program of Military Science and Tactics, page 11.

MUSIC

To secure the degree of bachelor of arts with major in music, a student must fulfill the requirements of both the Junior and Senior Colleges as stated in the Bulletin of the College of Science, Literature, and the Arts, securing 144 credits in courses other than practical music (piano, voice, etc., Courses 11 to 27). During the first two years he will register for English A-B-C or Composition 4-5-6, unless exempt from the requirement in English; foreign language; History 11-12-13; Psychology 1-2 and 4-5; and the following courses in music: 1-2-3, 4-5-6, 7-8, 34-35-36.

He must earn thirty credits in practical music selected from Courses 11 to 27, the number of credits in his major instrument to be determined by the department.

Major advisers in the College of Science, Literature, and the Arts.—Professor Scott; Associate Professor Hull.

Major sequences in the College of Science, Literature, and the Arts.—

A. Courses 50-51-52, 53-54-55, 56-57-58, 60-61-62 or 63-64-65, 76.
B. Courses 56-57-58, 60-61-62 or 63-64-65, 73-74-75, 76, 77-78-79.
C. Courses 56-57-58, 60-61-62 or 63-64-65, 70-71-72, 80-81-82.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Courses recommended for students who have a minor rather than a major interest in music—

A. Practical Music.
Courses 1, 4-5, 34-35-36, and twelve credits in practical music (Courses 11 to 27) in the Junior College plus ten credits in practical music (Courses 11 to 27) in the Senior College.
B. History and Criticism
Courses 1, 4-5, 34-35-36, 76, and 53-54-55 or 50-51-52 or 56-57-58.
C. Ensemble
Two years work (12 credits) or equivalent in practical music (Courses 11 to 27), Courses 34-35-36, 76, 60-61-62 or 63-64-65, 40-41-42 or 43-44-45.

For a special curriculum in Music Education see the College of Education Bulletin. For courses in Music Education see the program of the College of Education in this bulletin.

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.

Fees.—

Courses 11 to 27 inclusive:

1. One individual lesson per week, 2 credits $25.00
2. Two individual lessons per week, 4 credits 50.00
3. Class lessons in Courses 11C, 12C, 2 credits 15.00

Courses A-B-C and D-E-F:

1. One individual lesson per week, no credit 25.00

Practical music.—Students may enter courses in practical music (private lessons) any quarter.

Courses numbered from 11 to 27, inclusive, carry either 2 or 4 credits a quarter and must be repeated until the requirement in practical music has been met.

No student may count for graduation more than 36 credits in practical music.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.1f	Music Orientation (No cred.; freshmen majoring in music; no prereq.)				
		V	TTh	4Mu	Mrs. Nohavec, Mr. Ferguson, and others
1f	Ear Training (2 cred.; all; there is no prerequisite for this course, but no student should register for it until he has made arrangements for a placement test in the office of the Department of Music)				
	Sec. 1	III	MTWTh	3Mu	Miss Malcolm
	2	VI	MTWTh	3Mu	Miss Kendall
				103Mu	Miss Malcolm
2w-3s	Ear Training (2 cred.; continuation of 1)				
	Sec. 1	III	MW	3Mu	Miss Malcolm
	2	VI	MW	3Mu	Miss Kendall
				103Mu	Miss Malcolm
1w	Ear Training (See 1f)	II	MTWTh	3Mu	Miss Kendall
2s	Ear Training (See 2w)	II	TTh	3Mu	Miss Kendall
3f	Ear Training (See 3s)	II	TTh	3Mu	Miss Kendall
4w-5s	Harmony (6 cred.; all; prereq. 1)				
	Sec. 1	II	MWF	103Mu	Mr. Scott
	2	VII	MWF	103Mu	Mr. Scott
4s	Harmony (See 4w)	I	MWF	3Mu	Miss Malcolm
5f	Harmony (See 5s)	VII	MWF	3Mu	Miss Malcolm
6f	Harmony (continued) (3 cred.; all; prereq. 4-5)				
		III	MWF	103Mu	Mr. Scott
7w-8s†	Counterpoint (6 cred.; soph., jr., sr.; prereq. 4-5-6)				
		III	MWF	103Mu	Mr. Ferguson
29f	The Physical Basis of Music—Consideration of pitch, intensity, and quality of musical tones. Problems of resonance. Influences of amplifying systems on musical sounds. Physiological and psychological factors pertaining to music. Musical scales and their temperament. Study of musical instruments and the voice. Auditorium problems in ensemble playing (3 cred.; all; no prereq.) (Same as Phys. 15f)				
		VII	MWF	166Ph	Mr. Pepinsky
30w	Physics of Tone Color and Tone Production—Differentiation of tone quality of musical instruments and the voice. Variations of timbre with pitch range and intensity. Masking effects of instruments in combination. Mechanics of tone production and influences of interpretive values. Studies in the vibrato (3 cred.; all; prereq. Phys. 15 or 13) (Same as Phys. 17w)				
		VII	MWF	133Ph	Mr. Pepinsky

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

No.	Title	Hour	Day	Bldg.	Instructor
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.)	VII	TTh	MuAud	Mr. Scott, Mr. Killeen, Mr. Pepinsky, and others
34f-35w-36s¶	History of Music (6 cred.; soph., jr., sr.; no prereq.)				
	Lect.	II	MW	MuAud	Mr. Ferguson
	Rec. (optional)	II	F		
37f-38w-39s	Keyboard Harmony (3 cred.; all; prereq. 4-5)	II	TTh	103Mu	Mr. Jennings

Courses in Practical Music

For a statement about credits and prerequisites for courses in practical music other than Courses 40-41-42 and 43-44-45, see pages 68-69.

Af-Bw-Cs‡§	Piano (No cred.; no prereq. For students without entrance requirements in piano)	Ar	Ar	Mu	Ar
Df-Ew-Fs‡§	Voice (No cred.; no prereq. For students without entrance requirements in voice)	Ar	Ar	Mu	Ar
11f,w,s‡	Piano—Individual Lessons	Ar	Ar	Mu	Ar
11Cf,w,s†‡	Piano—Class Lessons*				
	Sec. 1	I	MW	Mu	Ar
	2	II	MW	Mu	Ar
	3	II	TTh	Mu	Ar
	4	III	TTh	Mu	Ar
	5	VI	TTh	Mu	Ar
12f,w.s‡	Voice—Individual Lessons	Ar	Ar	Mu	Ar
12Cf,w,s†‡	Voice—Class Lessons*				
	Sec. 1	VI	MWF	Mu	Ar
	2	VII	MWF	Mu	Ar
13f,w,s‡	Violin	Ar	Ar	Mu	Ar
14f,w,s‡	Viola	Ar	Ar	Mu	Ar
15f,w,s‡	Cello	Ar	Ar	Mu	Ar
16f,w,s‡	Double Bass	Ar	Ar	Mu	Ar
17f,w,s‡	Flute	Ar	Ar	Mu	Ar
18f,w,s‡	Oboe	Ar	Ar	Mu	Ar
19f,w,s‡	Clarinet	Ar	Ar	Mu	Ar
20f,w,s‡	Bassoon	Ar	Ar	Mu	Ar
21f,w.s‡	Trumpet	Ar	Ar	Mu	Ar
22f,w,s‡	French Horn	Ar	Ar	Mu	Ar
23f,w,s‡	Trombone	Ar	Ar	Mu	Ar
24f,w,s‡	Tuba	Ar	Ar	Mu	Ar
25f,w,s‡	Percussion	Ar	Ar	Mu	Ar
26f,w,s‡	Harp	Ar	Ar	Mu	Ar
27f,w,s‡	Organ	Ar	Ar	Mu	Ar
40f-41w-42s¶§§	Orchestra (6 cred.; all; prereq. consent of director)	7:30 p.m.	TW	NMA	Mr. Pepinsky
43f-44w-45s¶**	University Chorus (3 cred.; all; prereq. consent of director)	7:00-9:00 p.m.	T	5NMA	Mr. Killeen

* Science, Literature, and the Arts major students must take individual rather than class lessons in their major instrument. Music Education majors will take individual lessons in their major and class lessons in their minor instrument. No student may take class lessons for more than 6 credits. Classes in piano will be composed of 4 students; classes in voice may be composed of 6 students.

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

‡ See statement of fees, page 69.

§ May be taken only with the consent of the director.

¶ Students may enter any quarter.

** Students may receive credit for two years of chorus.

§§ Students majoring in music may earn twelve credits in orchestra.

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

No.	Title	Hour	Day	Bldg.	Instructor
50f-51w-52s	Music of the Eighteenth Century (6 cred.; jr., sr.; prereq. 35)				
		VIII, IX	TTh	104Mu	Mr. Pepinsky
53f-54w-55s	Romantic Movement (6 cred.; jr., sr.; prereq. 35)				
		VII	WF	104Mu	Miss Kendall
56f-57w-58s†	Bach and Beethoven (9 cred.; sr.; prereq. 34-35-36)				
		VI, VII	TTh	104Mu	Mr. Ferguson
59s	Technique of Voice (2 cred.; jr., sr.; prereq. 4-5, 29, and 6 cred. in Course 12 or 12C)				
		VI	TTh	4Mu	Mr. Killeen
60f-61w-62s	Instrumental Ensemble (6 cred.; jr., sr.)				
		VI	TTh	103Mu	Mr. Pepinsky
		III	S	103Mu	
63f-64w-65s	Vocal Ensemble (6 cred.; jr., sr.; prereq. 6 cred. in Course 12 or 12C)				
		II	TTh	104Mu	Miss Hull
66f-67w-68s	Advanced Vocal Ensemble (6 cred.; jr., sr.; prereq. consent of instructor)				
		Ar	Ar	104Mu	Mr. Killeen
69s	Advanced Physical Analysis of Musical Sounds (3 cred.; jr., sr.; prereq. Phys. 17, Math. 51) (Same as Physics 59)				
		VII	MWF	133Ph	Mr. Pepinsky
70f-71w-72s†	Normal Piano (6 cred.; jr.; prereq. 2 years piano)				
		I	MWF	103Mu	Miss Kendall
73f-74w-75s	Advanced Harmony (6 cred.; jr.; prereq. 4-5-6)				
		IV, V	T	103Mu	Mr. Scott
76f	Form and Analysis (3 cred.; jr., sr.; prereq. 4-5 and Psy. 1-2)				
		II	MWF	103Mu	Mr. Pepinsky
77f-78w-79s	Composition-Orchestration (6 cred.; jr., sr.; prereq. 4-5-6, 7-8)				
		Ar	Ar	Ar	Mr. Ferguson
80f-81w-82s†	Advanced Normal Piano (6 cred.; sr.; prereq. 70-71-72)				
		VIII	MWF	103Mu	Miss Kendall
83f-84w-85s	Advanced Composition (6 cred.; sr.; prereq. 77-78-79)				
		Ar	Ar	Ar	Mr. Ferguson
90f-91w-92s	Advanced Instrumental Ensemble (6 cred.; sr.; prereq. 60-61-62)				
		VI	MWF	104Mu	Mr. Pepinsky
95f-96w-97s	Piano Seminar (No cred; open only upon recommendation of the Music Department to a limited number of students regularly enrolled in the University)				
		VIII	W	104Mu	Mr. Mitropoulos
200f-201w-202s	Basis of Musical Expression (9 cred.; grad.; prereq. 56-57-58)				
		VII, VIII	W	Ar	Mr. Ferguson
	Conference hour	Ar	Ar	Ar	
	Seminar	VIII, IX	F	104Mu	
205f-206w-207s	Composition in Larger Forms (9 cred.; grad.; prereq. 83-84-85)				
		Ar	Ar	Ar	Mr. Ferguson
209f-210w-211s	Advanced Topics in Musical Analysis (9 cred.; grad.; prereq. 76)				
		Ar	Ar	Ar	Mr. Pepinsky
	Seminar	VIII, IX	F	104Mu	

NORWEGIAN

See Scandinavian, page 94.

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

ORIENTATION

No.	Title	Hour	Day	Bldg.	Instructor
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 freshmen; no prereq.)				
	Lect.	I	F	166Ph	Mr. Sirich,
	Sec. 1	I	MWF	9F	Miss Shaw,
	2	III	MWF	9F	and others
	3	VII	MWF	9F	
4w-5s	Man in Nature and Society (equivalent to 1f-2w-3s) (10 cred.; entering freshmen; no prereq.)	IV	MTWFS	6F	Ar
4s	Introduction to Natural Science (equivalent to first qtr. of 4-5) (5 cred.; entering freshmen; no prereq.)	III	MTWThF	5F	Mr. Carlson
6f-7w-8s	Art of the Twin Cities (9 cred.; fr., soph.; no prereq.)				
	Lect.	I	TTh	BoAud	Mr. Faulkner and others
	Rec. Sec. 1	IV	T	104J	
	2	VI	T	2J	

PHILOSOPHY

Major adviser in the College of Science, Literature, and the Arts.—Mr. Castell.

Major sequence in the College of Science, Literature, and the Arts—Courses 1; 50-51-52; 135-136 or 141; and additional courses, to be determined by the student's intellectual needs, to make a total of at least 27 credits in Senior College courses.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

For a list of recommended related courses in other departments, consult philosophy instructors or see the bulletin board outside 323 Folwell Hall. In particular, Pol. Sci. 164-165-166 may be offered to make up a major in philosophy if the department approves.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f-1w-3s	Logic, Problems of Philosophy, Ethics—A special sequence of courses in philosophy for prelegal freshmen. Only by special permission of the instructor will students be admitted to 1w-3s without 2f, or to 3s without 1w (5 cred. per qtr.; prelegal fr.; no prereq.)	VI	MTWThF	101L	Mr. Castell, Mr. Oliver
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.)	VI	MTWThF	200Pt	Mr. Everett

Courses 2 (Logic), 1 (Problems of Philosophy), and 3 (Ethics) may be taken singly, but the classes are scheduled so that they may be taken in the order 2f-1w-3s or 2w-1s without change of hour.

1f	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.)				
	Sec. 1	III	MTWThF	322F	Mr. Norborg
	2	VI	MTWThF	322F	Mr. Conger
1w	Problems of Philosophy (See 1f)				
	Sec. 1	IV	MTWFS	301F	Mr. Conger
	2	VII	MTWThF	322F	Mr. Castell

* Course 2 (Logic) is open in any quarter to a limited number of freshmen who are, on the basis of placement tests in English, exempt from Freshman English or eligible to take English A-B-C. Course 1 (Problems of Philosophy) is open to freshmen who have completed Course 2 (Logic). Course 3 (Ethics) is open to freshmen who have completed Course 1 (Problems of Philosophy).

No.	Title	Hour	Day	Bldg.	Instructor
1s	Problems of Philosophy (See 1f)				
	Sec. 1	I	MTWThF	322F	Mr. Conger
	2	II	MTWThF	321F	Mr. Norborg
2f	Logic—A study of inductive and deductive processes of reasoning, together with allied processes of knowledge (5 cred.; open to some fr.* and to soph., jr., sr.; no prereq.)				
	Sec. 1	IV	MTWFS	321F	Mr. Oliver
	2	VII	MTWThF	322F	Mr. Castell
2w	Logic (See 2f)				
	Sec. 1	I	MTWThF	322F	Mr. Oliver
	2	II	MTWThF	321F	Mr. Norborg
2s	Logic (See 2f)				
	Sec. 1	III	MTWThF	322F	Mr. Oliver
	2	VI	MTWThF	322F	Mr. Norborg
3f	Ethics—A study of the presuppositions, the nature, and the implications of moral judgments (5 cred.; open to some fr.* and to soph., jr., sr.; no prereq.)				
	Sec. 1	I	MTWThF	321F	Mr. Norborg
	2	II	MTWThF	321F	Mr. Everett
3w	Ethics (See 3f)				
	Sec. 1	III	MTWThF	200Pt	Mr. Everett
	2	VI	MTWThF	322F	Mr. Norborg
3s	Ethics (See 3f)				
	Sec. 1	IV	MTWFS	321F	Mr. Everett
	2	VII	MTWThF	322F	Mr. Castell
10w	Science and Religion (2 cred.; soph., jr., sr.; no prereq.)				
		II	TTh	322F	Mr. Swenson
20f	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.; soph., jr., sr.; no prereq.)				
		I	MWF	207F	Mr. Everett

Senior College Courses

Course 70 is open to prelegal sophomores who have an average grade of at least C in all their work and in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50f-51w-52s§	General History of Philosophy (9 or 15 cred.; jr., sr.; no prereq.)				
		IV	MWF	322F	Mr. Swenson
		or			
		IV	MTWFS		
53f	Kant and the Nineteenth Century—Roads to Kant: supernaturalism, naturalism, idealism, and skepticism. The critical philosophy of Kant. The metaphysical problem in the philosophies of Fichte, Hegel, and Schopenhauer. The political problem in the philosophies of Comte, Mill, and Marx. The impact of evolutionism. (3 cred.; sr.; prereq. 3 cred. including Course 52)				
		III	MWF	321F	Mr. Castell
55w	American Philosophy from Puritanism to Pragmatism—A study of Puritanism, the Revolutionary period, transcendentalism, evolutionism, idealism, and pragmatism (3 cred.; jr., sr., grad.; especially for students of American history and literature)				
		III	MWF	321F	Mr. Castell
61w	Philosophy of Science—The historical development of the logical concepts of science, especially substance, causality, space, time, and magnitude (3 cred.; jr., sr.; prereq. 2)				
		IV	MWF	305F	Mr. Oliver
62	*Logic of Science*—The scope and purpose of modern scientific method; its logical structure; recent developments in logical theory and their effects upon the use of logic in the sciences (3 cred.; jr., sr.; prereq. 61, or 2 and 20 cred. in one natural science) *(Not offered)*				

* Course 2 (Logic) is open in any quarter to a limited number of freshmen who are, on the basis of placement tests in English, exempt from Freshman English or eligible to take English A-B-C. Course 1 (Problems of Philosophy) is open to freshmen who have completed Course 2 (Logic). Course 3 (Ethics) is open to freshmen who have completed Course 1 (Problems of Philosophy).

§ Students may enter any quarter.

No.	Title	Hour	Day	Bldg.	Instructor
70s§	Modern Philosophies of Social Reform—Social philosophy as theory of social criticism. Central position of law and property in a theory of social criticism. Examination of democracy, laissez-faire, revolution, collective responsibility, communism, and fascism as concepts in modern social criticism. (3 cred.; prelegal; soph., jr., sr.; prereq. 6 cred. in philosophy or 10 cred. in social science)	III	MWF	321F	Mr. Castell
81w	Business Ethics—Ethical principles by which economic systems and practices may be judged; problems of fair service, fair competition, fair prices, and fair wages; relation of democracy to a system of free enterprise; other systems evaluated (3 cred.; jr., sr. in School of Business Administration and other jr., sr. who have earned nine credits in Senior College courses in Economics)	IV	MWF	321F	Mr. Everett
100f	History of Religions (3 cred.; jr., sr., grad.; prereq. 6 cred.)	II	MWF	322F	Mr. Conger
101w	Psychology of Religion (3 cred.; jr., sr., grad.; prereq. 6 cred.)	II	MWF	322F	Mr. Conger
102s	Philosophy of Religion (3 cred.; jr., sr., grad.; prereq. 6 cred.)	II	MWF	322F	Mr. Conger
103	*Esthetics* (3 cred.; sr., grad.; prereq. 8 cred. in phil. or 15 cred. in English) *(Not offered)*				
104s	History of Esthetic Theory—A survey of speculation on various forms of esthetic experience from Plato to Croce (3 cred.; jr., sr., grad.; prereq. 6 cred.)	II	TThS	322F	Mr. Swenson
105f	Fundamental Philosophies of Life (3 cred.; jr., sr., grad.; prereq. 6 cred.)	VIII	MWF	322F	Mr. Swenson
115w	Contemporary Philosophy (3 cred.; jr., sr., grad.; prereq. 6 cred.)	III	TThS	321F	Mr. Conger
116f	Philosophy of John Dewey—A survey of the ethical, social, educational, and logical contributions made to modern thought by this distinctively American thinker. (3 cred.; jr., sr., grad.; prereq. 6 cred.)	II	TThS	322F	Mr. Oliver
120	*Scandinavian Philosophy* (3 cred.; jr., sr., grad.; prereq. 10 cred.) *(Not offered)*				
124f	Political and Social Ethics (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. or 6 cred. in phil.)	I	MWF	322F	Mr. Everett
135w-136s	Philosophy of Plato (6 cred.; jr., sr., grad.; prereq. 8 cred. including Course 50)	VIII	MWF	322F	Mr. Swenson
141s	Metaphysics (5 cred.; jr., sr., grad.; prereq. 6 cred.)	IV	MTWFS	304F	Mr. Conger
147-148	*Advanced Logic* (6 cred.; jr., sr., grad.; prereq. 8 cred. in phil. including Course 2) *(Not offered)*				
151w	Philosophy of History—A survey of the mythological, religious, naturalistic, totalitarian, and economic interpretations of history, and a critical analysis of the historical categories; time, succession, causality, continuity, freedom, revolution, and progress (6 cred. in phil. or 10 cred. in hist.)	VII	MWF	321F	Mr. Norborg
161f-162w-163s	Seminar in Philosophy (9 cred.; sr., grad.; prereq. 20 cred. in phil. and consent of instructor)	Ar	Ar	Ar	Mr. Swenson, Mr. Conger, Mr. Castell

For Graduate Students Only

250f-251w-252s	Graduate History of Philosophy—An orientation in the history of western thought for graduate students specializing in other fields than philosophy (3 cred. per qtr.; no prereq.)	Ar	Ar	Ar	Ar

PHYSICAL EDUCATION FOR MEN

See the program of Physical Education for Men, page 13.

§ No student may receive credit for both Philosophy 70 and Political Science 161-162.

PHYSICAL EDUCATION FOR WOMEN

See the program of Physical Education for Women, page 16.

PHYSICS

Major adviser in the College of Science, Literature, and the Arts.—Associate Professor Valasek.

Major sequence in the College of Science, Literature, and the Arts.—Courses 101-103-105, plus 6 additional credits in Senior College courses, and Mathematics 50, 51, and 105.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

The physics included in specialized curriculum leading to the degree "B.S. in physics," offered in the Institute of Technology, will be accepted as a major sequence in this college.

Major adviser in the College of Education.—Professor Buchta.

Requirements for a teacher's certificate.—Courses 7-8-9. This is a general course in physics extending through three quarters.

Major recommendation.—The above general course and in addition Courses 52, 107-109-111 and six credits selected from 110-112, 124, 134, 144.

Minor recommendation.—The above general course plus Course 52 and one course selected from 110-112, 124, 134, 144.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
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)				
		III	MWF	166Ph	Mr. Nier
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)				
	Lect.	III	MWF	166Ph	Mr. Nier
	Lab. Sec. 1	I, II	Th	Ar	Mr. Miller
	2	VIII, IX	F	Ar	
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, the equivalent of Math. 1 and 6)				
	Lect. and quiz	I	MTWThF	133Ph	Mr. Rumbaugh
	Lab. Sec. 1	VI, VII	M		Mr. Miller
	2	VIII, IX	M		and assistants
	3	VIII, IX	T		
	4	VI, VII	Th		
	5	VIII, IX	F		
	6	III, IV	S		
4s-5f-6w‡	General Physics (See 4f-5w-6s)				
	Lect. and quiz	III	MTWThF	133Ph	Mr. Buchta
	Lab. Sec. 1	VIII, IX	M	Ar	Mr. Miller
	2	VI, VII	Th		and assistants
	3	VIII, IX	Th		
	4	VIII, IX	F		
	5	I, II	S		
	6	III, IV	S		

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

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

No.	Title	Hour	Day	Bldg.	Instructor
7f-8w-9s‡	General Physics (primarily for students majoring in physics, mathematics, or chemistry and for students in the Institute of Technology)—Mechanics, heat, sound, light, and electricity. Laboratory work is an integral part of the course (15 cred.; all; prereq. M.&M. 12 or Math. 6 or equiv.)				
	Schedule for 7f				
	Lect. Sec. 1	III	MTWF	150Ph	Mr. Williams
	2	II	MWThF	150Ph	Mr. Buchta
	3	VI	MWThF	150Ph	Mr. Buchta
	Quiz Sec. 1	IX	Th	150Ph	
	2	IX	M	150Ph	
	3	IX	T or Th	150Ph	
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	III, IV	W		
	11	VI, VII	W		
	12	VI, VII	Th		
	13	VIII, IX	Th		
	14	I, II	F		
	15	VI, VII	F		
	16	I, II	S		
	17	III, IV	S		
	Schedule for 8w				
	Lect. Sec. 1	III	MWFS	150Ph	Mr. Williams
	2	II	MWThF	150Ph	Mr. Buchta
	3	VI	MWThF	150Ph	Mr. Buchta
	Quiz Sec. 1	IX	T	150Ph	
	2	VII	T	166Ph	
		or			
		IX	M	150Ph	
	3	IX	Th	150Ph	
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	III, IV	W		
	11	VI, VII	W		
	12	VI, VII	Th		
	13	VIII, IX	Th		
	14	I, II	F		
	15	VI, VII	F		
	16	I, II	S		
	17	III, IV	S		
	Schedule for 9s				
	Lect. Sec. 1	III	MTWF	150Ph	Mr. Williams
	2	II	MWThF	150Ph	Mr. Buchta
	3	VI	MWThF	150Ph	Mr. Buchta
	Quiz and lab. See page 77.				

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

No.	Title	Hour	Day	Bldg.	Instructor
7f-8w-9s‡	General Physics—*Continued*				
	Schedule for 9s—*Continued*				
	Quiz Sec. 1	III	Th	150Ph	
	2	II	S	150Ph	
		or			
		VIII	Th	150Ph	
	3	VI	T	150Ph	
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	VI, VII	W		
	11	VI, VII	Th		
	12	VIII, IX	Th		
	13	I, II	F		
	14	VI, VII	F		
	15	I, II	S		
	16	III, IV	S		
7w-8s-9f‡	General Physics (See 7f-8w-9s)				
	Schedule for 7w				
	Lect.	II	MWThF	166Ph	Mr. Valasek
	Quiz	II	S	150Ph	
	Schedule for 8s				
	Lect.	II	MWThF	166Ph	Mr. Valasek
	Quiz	VIII	T	150Ph	
	Schedule for 9f				
	Lect.	II	MWThF	166Ph	Mr. Valasek
	Quiz	II	S	150Ph	
	Lab. schedule for 7w-8s-9f				
	Sec. 1	VI, VII	M	Ar	Mr. Miller
	2	VI, VII	W		and assistants
	3	VI, VII	F		
	4	VIII, IX	Th		
	5	III, IV	S		
15f	The Physical Basis of Music (3 cred.; all; no prereq.) (Same as Music 29)	VII	MWF	166Ph	Mr. Pepinsky
17w	Physics of Tone Color and Tone Production (3 cred.; all; prereq. Phys. 15 or 13) (Same as Music 30)				
	Lect.	VII	MWF	133Ph	Mr. Pepinsky
29f	Introduction to Meteorology—A presentation of the fundamental physical principles underlying meteorological phenomena, accompanied by instrumental observations and weather map study (3 cred.; all; prereq. high school physics or equiv.)	VI	MWF	133Ph	Mr. Miller

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

52w,s‡	Laboratory Arts (3 cred.; jr., sr.; prereq. 15 cred. in physics and approval of dept.)	VI, VII, VIII	TTh	39Ph	Mr. Haliday
59s	Advanced Physical Analysis of Musical Sounds (3 cred.; jr., sr.; prereq. Math. 51 and Phys. 13 or 15) (Same as Music 69)	VII	MWF	133Ph	Mr. Pepinsky

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

No.	Title	Hour	Day	Bldg.	Instructor
71f-73w-75s	Intermediate Physics—Discussion of selected problems in classical physics. Solution of problems (12 cred.; all; prereq. calculus and 15 cred. in physics)	II	TThFS	145Ph	Mr. Bardeen
101f-103w-105s	Theoretical Physics (15 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 106 or registration in 106)	III	MTWThF	145Ph	Mr. Rumbaugh
107f-109w-111s	Modern Physics (9 cred.; jr., sr., grad.; prereq. 15 cred.)	I	TThS	145Ph	Mr. Nier
110w-112s‡¶	Modern Experimental Physics (3 or 4 cred. per qtr.; jr., sr., grad.; prereq. 144)	VI-IX	TTh	145Ph	Mr. Williams
113w	Intermediate Acoustics (3 cred.; jr., sr., grad.; prereq. Math. 51, 15 cred. in physics)	Ar	Ar	Ar	Mr. Nier
114f-116w-118s¶	Elementary Physical Investigation (9 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51)	Ar	Ar	Ar	Ar
124w‡	Pyrometry (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MW	245Ph	Mr. Miller
126s‡	Advanced Heat (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MW	245Ph	Mr. Miller
131	*Geometrical and Physical Optics* (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51) *(Not offered)*				
134f,w‡	Experimental Optics (3 or 4 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MF	348Ph	Mr. Valasek
136w,s‡	Spectrum Analysis (3 or 4 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MF	348Ph	Mr. Valasek
137	*Electrical Properties of Crystals* (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51) *(Not offered)*				
144f‡	Electricity Measurements (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51)				
	Lect.	III	S	133Ph	Mr. Rumbaugh
	Quiz	II	Th	133Ph	Mr. Rumbaugh
	Lab. Sec. 1	VI, VII	MF	231Ph	
	2	VIII, IX	M	231Ph	
		VI, VII	W		
	3	III, IV	T	231Ph	
		VIII, IX	Th		
	4	VI, VII	TTh	231Ph	
	5	VIII, IX	TF	231Ph	
146w‡	Advanced Electricity Measurements (3 cred.; prereq. 144 and permission of instructor)	Ar	Ar	232Ph	Mr. Rumbaugh
152	*X Rays* (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics) *(Not offered)*				
154‡	*X-Ray Spectroscopy* (3 cred.; prereq. Math 51, and permission of instructor) *(Not offered)*				
181f-183w-185s	Atomistic and Elementary Quantum Mechanics—Atomic structure, X-rays, spectrum analysis and an introduction to wave mechanics (3 cred. per qtr.; sr., grad.; prereq. 101-102-103 or registration in that course)	Ar	Ar	Ar	Mr. Williams

GEOPHYSICS

61w	Introduction to Geophysical Prospecting—Qualitative discussions of the application of physical measurements to the location of petroleum and mineral deposits together with some discussion of the applications of geophysical methods to problems of near surface geologic structure (3 cred.; jr., sr.; prereq. a general course in physics, Math. 12)	Ar	Ar	342Ph	Mr. Wetzel
161f-162w	Principles of Geophysical Prospecting—Quantitative discussions of theory, instruments, field practice, and interpretation of seismic, electric, gravitational, and magnetic geophysical methods. (3 cred. per qtr.; jr., sr., grad.; prereq. a general course in physics, Math. 51)	Ar	Ar	342Ph	Mr. Wetzel
164f-165w-166s	Special Problems in Geophysics (Cred. ar.; prereq. permission of instructor)	Ar	Ar	Ar	Mr. Wetzel

‡ A fee of $2 per quarter is charged for this course.
¶ Students may enter any quarter.

PHYSIOLOGY

MEDICAL SCHOOL

Major adviser in the College of Science, Literature, and the Arts.—Professor Keys.

Major sequences in the College of Science, Literature, and the Arts.—

Sequence A. Physiology. Courses 100-101; 103; 104; 6 credits in courses numbered 113 to 140, or Zoology 109-110.

Sequence B. Physiological Chemistry. Courses 100-101; 21 credits in courses numbered 103 to 164, or suitable courses in agricultural biochemistry approved by the major adviser.

Sequence C. Biophysics. Courses will be arranged by Professor Stenstrom with interested students subject to the approval of the assistant dean for the Senior College.

Modification of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,s*	Elements of Physiological Chemistry (4 cred.; primarily for students of nursing§; no prereq.)				
	Lect.	IX	T	Ar	Dr. Arnow
		and			and others
		II	S		
	Lab.	I, II	T		
	Quiz	III	Th		
2f,s*	Elements of Physiology (4 cred.; primarily for students of nursing§; no prereq.)				
	Lect.	IX	Th	Ar	Dr. Kabat
		and			and others
		I	S		
	Lab.	III, IV	T		
	Quiz	II	Th		
4f,s*	Human Physiology (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.)				
		III, IV	MWF	301MH	Dr. King
					and others

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50f	Physiological Chemistry (5 cred.; primarily for phys. ed. students§; jr., sr.; prereq. general chemistry)				
		VI	MTWThF	Ar	Dr. Samuels
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)				
		IV	MWF	MH	Dr. Keys
		VI, VII, VIII, IX	T	MH	and others
		VI, VII, VIII	Th	MH	
56w	Physiological Chemistry (Primarily for dental students§; 4 cred.; jr., sr.; prereq. org. chem.)				
	Lect.	I	TThS	Ar	Dr. Armstrong
					and others
	Quiz	II	T	Ar	
57s	Physiological Chemistry (5 cred.; jr., sr.; prereq. 56)				
	Lect.	I	TThS	Ar	Dr. Armstrong
	Lab.	II, III, IV	Th		and others
		II, III	S		

* Will not count for credit for admission to the Medical School except by permission of the dean of that school.

§ Others may be admitted by special permission.

No.	Title	Hour	Day	Bldg.	Instructor
58w*	Human Physiology (6 cred.; primarily for dental students§; sr.; prereq. zool. and Physiol. 56, 57)				
	Lect.	I	TWThS	Ar	Dr. King
	Quiz	II	S	Ar	and others
	Lab.	II, III, IV	T	Ar	
59s*	Human Physiology (8 cred.; sr.; prereq. 58 or equiv.)				
	Lect.	I	MTThFS	Ar	Dr. King
	Quiz	II	T	Ar	and others
	Lab.	II, III, IV	ThS	Ar	
100f	Physiological Chemistry (7 cred.; jr., sr.; prereq. zool., org. chem., and phys.)				
	Lect.	IV	MTWF		Dr. Armstrong,
	Quiz	I	F		Dr. Heming-
	Lab.				way,
	Sec. AB	I, II, III	MW		Dr. Samuels,
	CD	I, II, III	ThS		Dr. Arnow
101w	Physiological Chemistry (6 cred.; jr., sr.; prereq. 100)				
	Lect.	IV	TS		Dr. Hemingway
		VI	F		and others
	Quiz	VI	T		
	Lab.				
	Sec. AB	I, II, III	MW		
	CD	I, II, III	ThS		
103f¶	Physiology of Circulation, Respiration, etc. (9 cred.; jr., sr.; prereq. zool. and org. chem.)				
	Lect.	I	MTWThFS		Dr. Visscher,
	Conference and lecture on				Dr. Scott
	genetics‖	III	TS		
	Lab.				
	Div. A	VI, VII, VIII	MW		
	B	II, III, IV	MW		
104w¶	Physiology of Endocrines, Nervous System, etc. (6 cred.; lect. only, 4 cred.; jr., sr.; prereq. 103 or org. chem. and neurology)				
	Lect.	IV	MTWF	Ar	Dr. Visscher,
	Conference‖	IV	S		Dr. Scott,
	Lab.				Dr. Kabat
	Div. A	9:00-11:20	M		
		1:30-4:00	W		
	B	1:30-4:00	M		
		9:00-11:20	W		

For other courses see the bulletin and programs of the Medical School.

POLITICAL SCIENCE

Major advisers.—Professors Anderson, Quigley, Short, and Starr.

Preparation for Senior College work.—Nine credits, including 6 in Course 1-2, and 3 in one of the following: Courses 3, 7, 15, and 25, except as otherwise noted in the prerequisites for particular Senior College courses.

Preparation for a major sequence and for the major in international relations.—Fifteen credits in courses numbered from 1 to 26, plus suitable preparation in History (1-2-3, 4-5-6, or 20-21-22), Economics (6-7 and 5) or Sociology (1 and 45). In addition students are advised to take one or more of the following: Philosophy 2, Geography 43, Psychology 1-2.

Major sequence.—The preparatory work noted above is designed to provide a general knowledge of (1) the American system of government, and (2) the principal terms and

* Will not count for credit for admission to the Medical School except by permission of the dean of that school.

§ Others may be admitted by special permission.

¶ Students may register for lectures without laboratory.

‖ Optional for nonmedical students.

concepts of political science. To this knowledge the major sequence should add the following: (3) a knowledge of the works of a number of great contributors to political ideas; (4) fairly exact and thoro knowledge of some extensive part of at least three of the following fields of political science: (a) American government, politics, and administration; (b) public law; (c) comparative modern government; (d) political theory; (e) local government and administration; (f) international law, organization, and relations; and (5) development of the ability to study independently in at least one of the three chosen fields.

To these ends the student will be expected to take four courses meeting three times a week throughout the year, or the equivalent, including at least one three-quarter sequence in each of his selected fields. To meet the four-course requirement, a student may, with the approval of his adviser, offer the equivalent of one course selected from closely related offerings in Economics, History, Journalism, Psychology, and Sociology. For a list of such approved offerings see the major advisers.

Major in international relations (training for the foreign service).—A special program taking the place of a major sequence will be arranged for students of good standing who desire a general introduction to this field. Courses are drawn from Political Science, Economics, History, Geography, and related departments. Those intending to take the examinations for the American foreign service are advised to follow this program and to prepare themselves adequately in modern foreign languages. Consult Mr. Quigley.

Tutorial and honors courses.—Students who are capable of doing better than average work and who wish to specialize or to study for graduation honors are advised to take some of the special tutorial courses: 4, 5, 6, 17, 26, and 91-92-93. Course 91-92-93 may be elected for independent work in any of the six fields noted above in the description of the major sequence.

Major adviser in the College of Education.—Professor Field.

Requirements for a teacher's certificate.—Major recommendation: At least 36 credits in political science including 1-2-3, either 7, 15, or 25, and at least 12 credits in Senior College courses.

Minor recommendation: At least 18 credits in political science, including 1-2-3, either 7, 15, or 25, and 3 credits in Senior College courses.

For a comprehensive curriculum in social studies, see College of Education Bulletin.

Note for graduate students.—Courses in political science that are indicated as being open to juniors, seniors, and graduates may be taken by graduate students for full credit, subject to the requirement of additional work over and above that assigned to undergraduates, or they may be taken by graduate students for reduced credit.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs†§	Introduction to Government (for prelegal students)—A survey of the development of political institutions and ideas, followed by comparative study of the organization and practice of modern governments, with emphasis upon the American system. (9 cred.; no prereq. This course is for prelegal freshmen only. No student will be given credit for both Courses A-B-C and 1-2-3)	VII	MWF	206Pt	Ar

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

§ No student will be given credit for both courses A-B-C and 1-2-3.

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†-3s§	American Government and Politics—Part 1-2. National, state, and local. Constitutions and fundamental laws; governmental 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.)				
		I	MWF	206Pt	Mr. Kirkpatrick
		IV	MWF	BuAud	Mr. Christensen
1w-2s†§	American Government and Politics (6 cred.; all; no prereq.)				
		III	MWF	206Pt	Ar
4,5,6f,w,s	Tutorial Work in American Government and Politics (2 cred. per qtr.; open to students registered in 2, 3 with grade of B or better in preceding quarter of 1-2-3, and to students who have completed 1-2 with equally satisfactory standing. Consult instructor)				
	Fall 4f	III	TTh	204EdH	Ar
	Winter 5w	III	TTh	204EdH	Ar
	Spring 6s	I	MW	204EdH	Mr. Christensen
	4s	II	TTh	204EdH	Ar
7w,s	Comparative European Government—The governments of Great Britain, France, Italy, Germany, and Russia. Constitutions; governmental organization; parties and elections (3 cred.; all; prereq. Course 1. Course 7 may be taken simultaneously with Course 2 or 3)				
	Winter	VII	MWF	211Bu	Ar
	Spring	II	TThS	221Bu	Ar
15f,s	Elements of Political Science—The nature and functions of the state; sovereignty and liberty; constitutions; forms of government (3 cred.; all; prereq. Course 1. Course 15 may be taken simultaneously with Course 2 or 3)				
	Fall	II	TThS	221Bu	Mr. Lippincott
	Spring	VII	MWF	209Bu	Mr. Lippincott
17w	Tutorial Work in Elements of Political Science (2 cred.; open to students who have had or are registered in 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)				
		VII	MW	204EdH	Mr. Lippincott
25f,w	World Politics—Introduction to contemporary international relations; the policies of the great powers; nationalism; imperialism; internationalism (3 cred.; all; prereq. Course 1 or Hist. 1-2. Course 25 may be taken simultaneously with Course 2 or 3)				
	Fall	VII	MWF	211Bu	Mr. Mills
	Winter	II	TThS	211Bu	Mr. Mills
26w	Tutorial Work in World Politics (2 cred.; open to students registered in 25, with honor point average of 1.5 and grade of B in 1-2, or in portion thereof completed, and to advanced students of satisfactory standing. Consult instructor.)				
		VII-VIII	W	108F	Mr. Mills

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

61f-62w-63s†	American Constitutional Development (9 cred.; jr., sr.; prereq. 9 cred. or Hist. 20-21-22)				
		I	TThS	221Bu	Mr. Kirkpatrick
71f	Recent Social Legislation (3 cred.; jr., sr.; prereq. 9 cred.)				
		III	TThS	112Bu	Mr. Christensen
73w-74s†	Government and the Economic Order (6 cred.; jr., sr.; prereq. 9 cred.)				
		III	TThS	112Bu	Mr. Christensen
85s	Problems of World Politics (3 cred.; jr., sr.; prereq. 25 or Hist. 1-2-3)				
		II	MWF	211Bu	Mr. Mills
91f-92w-93s	Tutorial and Honors Work in Selected Fields (Cred. ar.; jr., sr.; prereq. 18 cred.; consult major advisers)				
		Ar	Ar	Ar	Ar

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

§ No student will be given credit for both courses A-B-C and 1-2-3.

No.	Title	Hour	Day	Bldg.	Instructor
97s	American and European Colonies of Today (3 cred.; jr., sr.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	VI	MWF	209Bu	Mr. Mills
101f-102w-103s†	Constitutional Law (9 cred.; jr., sr., grad.; prereq. 9 cred.)	VI	MWF	211Bu	Mr. Field
108w	Legislative Organization and Procedure (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	112Bu	Mr. Short
116f-117w†-118s	Local Government (9 cred.; jr., sr., grad.; prereq. 9 cred.)	I	MWF	221Bu	Mr. Anderson
120f	Municipal Functions (3 cred.; jr., sr., grad.; prereq. 9 cred.)	II	TThS	209Bu	Mr. Ludwig
121w	Municipal Administration (3 cred.; jr., sr., grad.; prereq. 120 or consent of instructor)	II	TThS	209Bu	Mr. Ludwig
122s	Municipal Problems (3 cred.; jr., sr., grad.; prereq. 121 or consent of instructor)	II	TThS	209Bu	Mr. Ludwig
131f-132w†	Public Administration I—National and State: Organization and Staff Services (6 cred.; jr., sr., grad.; prereq. 9 cred.)	II	MWF	221Bu	Mr. Short
133s	Public Administration II—Functional Services (3 cred.; jr., sr., grad.; prereq. 131-132 or consent of instructor)	II	MWF	221Bu	Mr. Short
144f	American Political Parties (3 cred.; jr., sr., grad.; prereq. 9 cred.)	II	TThS	211Bu	Mr. Christensen
145-146†	*British Government and Politics* (6 cred.; jr., sr., grad.; prereq. 9 cred.) *(Not offered)*				
147	*French Government and Politics* (3 cred.; jr., sr., grad.; prereq. 9 cred.) *(Not offered)*				
148	*European Dictatorships* (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.) *(Not offered)*				
149-150†	*Government and Politics of the British Empire* (6 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.) *(Not offered)*				
151	*Problems of the British Dominions* (3 cred.; jr., sr., grad.; prereq. 149-150 with grade of C+ or better, or consent of instructor) *(Not offered)*				
153	*Japanese Government and Politics* (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.) *(Not offered)*				
154f	Chinese Government and Politics (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	IV	MWF	209Bu	Mr. Quigley
161w-162s†§	Recent Political Thought (6 cred.; sr., grad.; prereq. 18 cred. or consent of instructor)	III	MWF	211Bu	Mr. Lippincott, Mr. Kirkpatrick
163	*Topics in American Political Thought* (3 cred.; jr., sr., grad.; prereq. 15, 161, 164, or consent of instructor) *(Not offered)*				
164f-165w-166s†	Development of Political Thought (9 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 credit in soc. sci.)	IV	MWF	211Bu	Mr. Lippincott, Mr. Kirkpatrick
167f-168w-169s†	Readings in the Classics of Politics (6 cred.; jr., sr., grad.; prereq. 15, or 164-165 with which it may be taken simultaneously, or consent of instructor)	VIII-IX	W	204EdH	Mr. Lippincott, Mr. Kirkpatrick
170s	Problems of Democracy (3 cred.; jr., sr., grad., prereq. 15 or 161 or 164 or consent of instructor)	II	TThS	211Bu	Mr. Lippincott
171s	Political Psychology (Identical with Psy. 141) (3 cred.; jr., sr., grad.; prereq. Psy. 1-2)	III	TThS	206Pt	Mr. Bird
180f-181w-182s†	International Law (9 cred.; jr., sr., grad.; prereq. 9 cred.)	VII	MWF	112Bu	Mr. Riesenfeld

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

§ No student may receive credit for both Political Science 161-162 and Philosophy 70.

No.	Title	Hour	Day	Bldg.	Instructor
184w	International Organization (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	209Bu	Mr. Quigley
185s	Theories of International Relations (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	209Bu	Mr. Quigley
191f-192w-193s†	Far Eastern Diplomacy (9 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	II	MWF	209Bu	Mr. Quigley
195f-196w	Colonial Government and the Problems of Imperialism (6 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	VI	MWF	209Bu	Mr. Mills

Courses Primarily for Graduate Students

The following courses may be taken by seniors majoring in Political Science with consent of the instructor:

204f-205w-206s†	Topics in Administrative Law (9 cred.; grad.; prereq. 18 cred. in political science or consent of instructor)	VIII-IX	W	301Lib	Mr. Field
231w	Scope and Methods of Political Science (3 cred.; grad.; prereq. admission to graduate major, or consent of instructor)	VII	MWF	209Bu	Mr. Anderson
232s	Problems of Public Planning (3 cred.; sr. with consent of instructor, grad.; prereq. 15 cred. in pol. sci.)	VII	MWF	211Bu	Mr. Anderson
242f-243w-244s	Topics in Colonization (9 cred.; grad.; prereq. 195-196 or consent of instructor)	VIII-IX	M	215Bu	Mr. Mills

PREVENTIVE MEDICINE AND PUBLIC HEALTH

MEDICAL SCHOOL

Advisers in the College of Science, Literature, and the Arts.—Professors Anderson and Boynton.

Major advisers in the College of Education.—Professors Anderson and Boynton; Assistant Professor Arnstein.

Minor sequence in the College of Science, Literature, and the Arts or in the College of Education.—Courses 50 or 51, 57, 59, and Bact. 41 are recommended.

Major sequence in Public Health Nursing.—P.M.&P.H. 53, 62, 63, 65, 66, 67; Med. 133; additional P.M.&P.H. courses, 8 credits. (Ed.T. 50 and H.E. 76 may be counted as P.M.&P.H. courses to satisfy this requirement of 8 credits).

Additional requirements.—Social science (other than sociology), 9 credits; Freshman English or exemption from the requirement; Bact. 41 or 101; Psy. 1, 2; Soc. 1, 49, 129, and 3 additional credits in Sociology or Child Welfare; natural science courses, 15 credits.

Note.—The sequence leads to a B.S. degree with a major in public health nursing, the nine months certificate course having been discontinued except for students already holding a B.A. or a B.S. degree.

For additional details of courses of study in public health consult the Bulletin of the Department of Preventive Medicine and Public Health.

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

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f	First Aid (1 cred.; no prereq.) (Limited to 20 women)	VI, VII	T	Coll. Dorm., UF	Miss Fisher
2s	First Aid (See 2f) (Limited to 20 women)				
	Sec. 1	I, II	Th	Coll. Dorm., UF	Miss Fisher
	2	VI, VII	W	Coll. Dorm., UF	Miss Fisher
3f	Personal Health (2 cred.; fr., soph.; no prereq.; not open to students who have taken Human Biology in the General College)	VI	MW	BuAud	Dr. O'Brien
3w	Personal Health (See 3f)	VI	WF	BuAud	Dr. O'Brien
3s	Personal Health (See 3f)	VI	MW	BuAud	Dr. O'Brien
4w,s	Health Problems of Adult Life (2 cred.; all; prereq. 3 or Human Biology in the General College)	VI	TTh	*	Dr. Watson

Senior College Courses

Courses 53 and 57 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50f	Public and Personal Health (3 cred.; open to jrs. and srs. who have not taken Course 3, 4, 52 or Human Biology in the General College; no prereq.)	VII	MWF	*	Dr. Hinckley
50s	Public and Personal Health (See 50f)	IV	MWF	*	Dr. Hinckley
51f	Community Hygiene (3 cred.; jr., sr.; prereq. 3, or Human Biology in the General College; not open to students who have taken 50, 52, or 53)	VII	MWF	*	Dr. Cowan
51s	Community Hygiene (See 51f)	IV	MWF	*	Dr. Cowan
52f,w,s	Health Care of the Family (3 cred.; jr., sr.; prereq. Bact. 41, Physiol 4; not open to students who have taken Course 50, 51 or 53) (Lab. sections limited to 40)	VI	MWF	313HE	Dr. Lange, Miss Fisher
53f	Elements of Preventive Medicine and Public Health (For public health nurses and students in medical social work only) (5 cred.; prereq. 3 or 50, or equiv., and a course in bacteriology)				
	Lect.	II	MWF	*	Dr. Anderson, Dr. Cowan
	Rec. Sec. 1	III	TTh	*	
	2	VI	TTh	*	
55s	Nursing and Social Problems in the Control of Gonorrhea and Syphilis (2 cred.; prereq. 53 and 62. Soc. 90 or 109 may be substituted by medical social service students. Course 55 may be taken concurrently with any of these prerequisites)	III	TTh	*	Miss Arnstein
57s	Health of Infant and Preschool Child (2 cred.; jr., sr.; prereq. Psy. 1-2; or P.M.&P.H. 4, 50, 51, 52 or 53)	III	TTh	*	Dr. Boynton
58w	Maternal and Child Hygiene (For public health nurses only) (2 cred.; prereq. 53)	II	TTh	*	Dr. Boynton
59s	Health of the School Child (3 cred.; jr., sr.; prereq. 4, 50, 51, 52 or 53)	II	MWF	*	Dr. Ellis

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

No.	Title	Hour	Day	Bldg.	Instructor
60f,s	Tuberculosis and Its Control (For public health nurses. Others may be admitted by special permission) (2 cred.; prereq. 4, 50, 51, 52, or 53 and 62 which may be taken concurrently)	IV	TS	*	Dr. Myers
62f-63w†	Principles of Public Health Nursing (For public health nurses only) (6 cred.; jr., sr.; prereq. Soc. 1, Psy. 1-2 or permission of instructor)				
	Sec. 1§	III	MWF	*	Miss Arnstein
	2§	VI	MWF	*	
65,66,67f,w,s	Field Practice in Public Health Nursing¶ (For public health nurses only) (Cred. ar.; jr., sr.; prereq. 53, 62) The credits are to be allowed, according to experience, to these special fields: P.M.&P.H. 65—School Nursing; P.M.&P.H. 66—County Nursing; P.M.&P.H. 67—Family Health Agency	Ar	Ar	*	Miss Arnstein
68s	Field Work in Orthopedic Nursing (Cred. ar.; prereq. 65, 66, 67, Phys. Ed. 50, or permission of instructor; jr., sr.; public health nurses only)	Ar	Ar	*	Miss Arnstein
69s	School Nursing (3 cred.; prereq. 53, 62-63)	I	MWF	*	Miss Palmer
103f,w,s	Public Health Bacteriology (3 cred., or more by arrangement; jr., sr., grad.; prereq. Bact. 101-102, 116 and permission of instructor)	Ar	Ar	*	Dr. Heathman
106f,w	Public Health Administration (3 cred.; physicians, engineers, nurses, social workers, and others by arrangement; prereq. 53, 100, 109 or equiv. Course 106 may be taken concurrently with any of the prerequisites)	I	TThS	*	Dr. Anderson
108w	Care of the Handicapped Child (For physicians and nurses) (2 cred.; prereq. 53, 62-63, Psy. 1-2, or permission of instructor)	I	MW	*	Dr. Hilleboe and associates
170s	Supervision in Public Health Nursing (For public health nurses only) (3 cred.; sr.; prereq. 53, 62-63 and experience in public health nursing)	II	TThS	*	Miss Arnstein
171f,w,s	Advanced Problems in Public Health Nursing (For public health nurses only) (Cred. ar.; sr., grad.; prereq. 170, or permission of instructor)	Ar	Ar	*	Miss Arnstein and staff
173f,w,s	Field Work in Supervision (For public health nurses only) (Cred. ar.; sr., grad.; prereq. 170 with which it may be taken simultaneously)	Ar	Ar	*	Miss Palmer

For Graduate Students Only

200f,w,s	Research	Ar	Ar	*	Dr. Anderson
210f,w,s	Seminar in Preventive Medicine and Public Health (By permission)	Ar	Ar	*	Dr. Anderson and staff

For courses in public health offered to physicians and engineers, see the Bulletin of the Graduate School, or the Bulletin of the Department of Preventive Medicine and Public Health.

BIOSTATISTICS

110f	Biometric Principles (3 cred.; jr., sr., grad.; prereq. 18 cred. biological science or mathematics through analytic geometry)	III	TThS	*	Mr. Treloar

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

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

§ Sec. 1 is for students who have not had practical experience in public health nursing; Sec. 2 is for students who have had such experience.

¶ Students must maintain a C average in theory completed before they are admitted to field work.

No.	Title	Hour	Day	Bldg.	Instructor
110s	Biometric Principles (See 110f)	I	TThS	*	Mr. Treloar
111f,s‡	Biostatistics Laboratory (2 cred.; to be taken with 110)	Ar	Ar	*	Miss Gunstad
120w	Correlation Analysis (3 cred.; sr., grad.; prereq. 110 or consent of instructor)	III	TThS	*	Mr. Treloar
121w‡	Correlation Laboratory (2 cred.; to be taken with 120)	Ar	Ar	118MH	Miss Gunstad
130s	Statistical Interpretation (3 cred.; sr., grad.; prereq. 110 or consent of instructor)	III	TThS	*	Mr. Treloar
131s‡	Sampling Laboratory (2 cred.; to be taken with 130)	Ar	Ar	*	Mr. Treloar
140f,w,s‡	Topics in Biometry (Cred. ar.; sr., grad.; prereq. 120 and 130, or consent of instructor)	Ar	Ar	*	Mr. Treloar
150f,w,s‡	Life Tables (3 cred.; prereq. permission of instructor)	Ar	Ar	*	Mr. Treloar

PSYCHOLOGY

Major advisers in the College of Science, Literature, and the Arts.—Professors Bird, Elliott, Paterson, and Tinker.

Major sequences in the College of Science, Literature, and the Arts.—

A. Experimental psychology. Courses 101-102-103; 125-126; and 12 additional credits in Senior College courses.

B. Human and animal behavior. Courses 114; 148; 151-152-153; and 12 additional credits in Senior College courses either in psychology or zoology.

C. Differential psychology. Courses 125-126-127; 160; Educational Psychology 141; and 13 additional credits in Senior College courses.

(Prerequisites: For Sequence A, 1-2 and 4-5. Course 55 is recommended. For Sequence B, 9 credits. For Sequence C, 1-2 and 4-5. Course 3 is recommended. Courses in mathematics are recommended for students majoring in psychology.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Honors course.—Students interested in the work of an honors course should consult the chairman of the department.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
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.)				
	Sec. 1	I	MWF	BuAud	Mr. Elliott
	2	III	MWF	BuAud	and others
1s,2s	General Psychology (6 cred.; soph., jr., sr.; no prereq.)				
	Sec. 1	II	MTWThFS	JAud	Mr. Bird
	2	IX	MTWThF	301F	
		VIII	Th		
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)	III	MWF	BuAud	Mr. Paterson and others

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

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

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

No.	Title	Hour	Day	Bldg.	Instructor
4f‡-5w*†‡	Introductory Laboratory Psychology—Simple experiments illustrating the subject-matter of contemporary psychology. Included are human and animal learning, visual experience, differences in artistic, musical, and other kinds of abilities, measurement of each student's personality traits, and reactions to advertisements. (4 cred.; soph., jr., sr.; may be taken with or after 1-2) (Sections limited to 48)				
	Sec. 1	I, II	MW	211Psy	Mr. Tinker
	2	VIII, X	MW	211Psy	and others
	3	I, II	TTh	211Psy	
	4	VI, VII	TTh	211Psy	
	5	III, IV	TS	211Psy	
	6	VIII, IX	TTh	211Psy	
	7§ (premedic)	VI, VII	MW	211Psy	
4s‡,5s*‡	Introduction to Laboratory Psychology (See 4f-5w)				
	Sec. 1	I, II	MTThF	211Psy	Mr. Tinker
	2	VI, VII	MTThF	211Psy	and others
	3	VIII, IX	MTThF	211Psy	
7s	This course has been renumbered 4s,5s.				

Senior College Courses

Courses 52 and 55 are open to third quarter sophomores who have an average grade of at least C in Course 1-2. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

52s	Genetic Psychology (3 cred.; soph., jr., sr.; prereq. 1-2)				
		IV	MWF	115Psy	Mr. Heron
55s	Psychology of Sensation (3 cred.; soph., jr., sr.; prereq. 1-2)				
		IV	MWF	211Psy	Mr. Tinker
56f	Psychology of Advertising (3 cred.; jr., sr.; prereq. 1-2, and Principles of Economics)				
		II	MWF	211Bu	Mr. Longstaff
56w	Psychology of Advertising (See 56f)				
		VII	MWF	166Ph	Mr. Longstaff
64f	The Higher Mental Processes—Selected aspects of attention, thinking, emotion, motivation, and other higher mental processes will be discussed. Historical experiments and practical applications of principles will be reviewed. (3 cred.; jr., sr.; prereq. 1-2)				
		II	TThS	115Psy	Mr. Baker
72s	The Psychology of the Fine Arts—An analysis of the production and enjoyment of works of art from the standpoint of psychology, with emphasis on experimental data (3 cred.; jr., sr.; prereq. 1-2)				
		II	MWF	115Psy	Mr. Skinner
74	*The Psychology of Literature*—The processes involved in the creation and enjoyment of literature. The descriptive and emotive uses of language, the bases of style, metaphor, word-play, the rôle of unconscious language processes, modern trends toward psychological subject-matter (3 cred.; jr., sr.; prereq. 1-2) *(Not offered)*				
84f	Psychology of Learning (3 cred.; jr., sr.; prereq. 1-2)				
		III	TThS	109Psy	Mr. Heron
86s	Biographical Psychology—Human personalities in relation to their ancestries, their bodies, and their environments, physical and social (3 cred.; jr., sr.; prereq. 9 cred. in psy.)				
		II	TThS	115Psy	Mr. Elliott

* Students completing projects with distinction may be recommended to receive either one or two additional credits.

† 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.

§ The experiments in this section are chosen to meet the interests and needs of premedical students. Not open to others. Should be taken preferably in the third year, but may be taken by any premedical student who is taking or has taken Psy. 1-2.

No.	Title	Hour	Day	Bldg.	Instructor
90f,91w,92s	Readings in Psychology—Tutorially directed reading and preparation of reports on special topics (Cred. ar.; jr., sr.; prereq. 1-2; 4-5 or Zool. 1-2-3; and written permission of instructor)	Ar	Ar	Ar	Mr. Elliott, Mr. Bird, Mr. Paterson, Mr. Heron, Mr. Tinker, Mr. Baker, Mr. Skinner
101f-102w†-103s	Experimental Psychology (3 cred. per qtr.; cred. ar. for honors students; jr., sr., grad.; prereq. 1-2; and 4-5 or equiv. in another science)	VII	MWF	116Psy	Mr. Tinker
		VIII	WF		
108f	Systems of Psychology—A reading course (3 cred.; jr., sr., grad.; prereq. 1-2 and consent of instructor)	Ar	Ar	Ar	Mr. Elliott
114w§	Human Behavior (3 cred.; sr., grad.; prereq. 1-2; 4-5 or Zool. 1-2-3, or Phil. 1)	II	TThS	115Psy	Mr. Elliott
125f-126w†	Psychology of Individual Differences (6 cred.; cred. ar. for honors students; sr., grad.; prereq. 1-2; 4-5 or 5 cred. in statistics)	II	MWF	115Psy	Mr. Paterson
127s	Projects in the Psychology of Individual Differences (3 cred.; sr., grad.; primarily for majors in Sequence C; prereq. 125-126)	Ar	Ar	Ar	Mr. Paterson
130s	Vocational Psychology (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy.)				
	Lect.	IV	TS	115Psy	Mr. Paterson
	Lab. Sec. 1	VI-VII	W	211Psy	
	2	VIII-IX	W	211Psy	
140w	Social Psychology (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy.; or 6 cred. in psy. and either Zool. 1-2-3 or 12 cred. in soc.)	III	TThS	206Pt	Mr. Bird
141s	Political Psychology (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy.)	III	TThS	206Pt	Mr. Bird
144f-145w†	Abnormal Psychology (6 cred.; jr., sr., grad.; prereq. 9 cred. in psy.; or 6 cred. in psy. and either Zool. 1-2-3 or 12 cred. in soc.)	IV	MWF	206Pt	Mr. Bird
148w	Physiological Psychology—The topics treated and illustrated by demonstrations will include the elements of neural anatomy and physiology, tonus, neuromuscular set, integration, and the neural basis of learning. The treatment of these topics will stress their importance for psychology. (3 cred.; sr., grad.; prereq. 1-2; 4-5 or Zool. 1-2-3, or consent of instructor)	VII	MWF	115Psy	Mr. Hathaway
151f-152w†-153s	Animal Psychology (9 cred.; cred. ar. for honors students; sr., grad.; prereq. 1-2; 4-5 or equiv. in another science)				
	Lect.	VI	MWF	109Psy	Mr. Heron
	Lab. in 153s	Ar	Ar		
160f	Psychology in Personnel Work (3 cred.; sr., grad.; prereq. 1-2, and Principles of Economics or 9 cred. in political science)	III	MWF	211Bu	Mr. Longstaff

ROMANCE LANGUAGES

Major advisers in the College of Science, Literature, and the Arts.—Professor Searles; Associate Professor Grismer; Assistant Professor Clefton.

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

§ This is part of Course 114w-115s, "Human Behavior." 115s will not be given in 1939-40.

Major sequences in the College of Science, Literature, and the Arts—

FRENCH

Courses 70-71-72 or 73-74; five credits in conversation and composition, if the student has not taken French 20; a minimum of 21 additional credits chosen from courses numbered 50 or above, of which at least 9 must be in literary courses.

ITALIAN

Twenty-four credits in courses numbered 50 or above, and 3 additional credits chosen from the following: English 140, 146-147, 148-149; French 121-122-123, 153; Italian 159-160, 161-162; Latin 121; History 153-154-155.

SPANISH

Five credits in conversation and composition, if the student has not taken Spanish 20.

Nine credits in literary courses, and in addition enough credits chosen from courses numbered 50 or above to make a minimum of 27 Senior College credits in all.

MIXED (FRENCH, ITALIAN, AND SPANISH)

Five credits in conversation and composition.

One literary course above 50, and in addition enough credits chosen from courses in any of the three languages numbered 50 or above to make a minimum of 27 credits in all.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Barton.

Requirements for a teacher's certificate.—Major recommendation: 35 credits in one language numbered above 4, these courses to include in the case of French, Survey of French Literature and one other literary course; 50; 53, 54-55 (or 20); 63; and 103-104-105.

Minor recommendation: 17 credits in one language in courses numbered above 4.

Admission to advanced courses.—No student will be allowed to elect courses more advanced than intermediate French or Spanish unless he has received an average grade of C in the intermediate courses.

FRENCH

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†	Beginning French (10 cred.; all; no prereq.)				
		I	MTWThF	227F	Ar
		IV	MTWFS	202F	Ar
		VI	MTWThF	226F	Ar
1w-2s†	Beginning French (See 1f-2w)	IV	MTWFS	227F	Ar
1s	Beginning French (1st qtr. of 1-2. See 1f-2w)				
		IV	MTWFS	303F	Ar
2f	Beginning French (2nd qtr. of 1-2. See 1f-2w)				
		I	MTWThF	202F	Ar
		VI	MTWThF	202F	Ar
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)				
		I	MTWThF	201F	Ar
		III	MTWThF	226F	Ar
		VII	MTWThF	202F	Ar
3w-4s	Intermediate French (See 3f-4w)				
		I	MTWThF	202F	Ar
		VI	MTWThF	202F	Ar

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

No.	Title	Hour	Day	Bldg.	Instructor
3s	Intermediate French (1st qtr. of 3-4. See 3f-4w)				
		I	MTWThF	227F	Ar
		IV	MTWFS	202F	Ar
		VI	MTWThF	226F	Ar
4f	Intermediate French (2nd qtr. of 3-4; prereq. 3, or three years of high school French)				
		II	MTWThF	15F	Ar
		IV	MTWFS	227F	Ar
		VI	MTWThF	101F	Ar
20f	Oral and Written French (5 cred.; all; prereq. 4, or four¶ years of high school French)				
		III	MTWThF	303F	Mr. Jordan
		VII	MTWThF	201F	Mr. Fermaud
20s	Oral and Written French (See 20f)				
		I	MTWThF	201F	Ar
		III	MTWThF	226F	Ar
		VII	MTWThF	202F	Ar

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50f,w,s	French Pronunciation (3 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	203F	Ar
53f	French Composition (3 cred.; jr., sr.; prereq. 3-4)				
		III	TThS	201F	Ar
		VI	MWF	205F	Mr. Minault
54w-55s	French Conversation (4 cred.; jr., sr.; prereq. 53 or 20)				
		III	TThS	201F	Ar
		VI	MWF	212F	Mr. Minault
62s	Advanced Pronunciation and Diction (3 cred.; jr., sr.; prereq. 50)				
		I	MWF	203F	Ar
63f-64w	Advanced French Composition (6 cred.; jr., sr.; prereq. 53 or 20 with a grade of B)				
		II	MWF	203F	Ar
65s	Advanced French Conversation (3 cred.; jr., sr.; prereq. 54-55 or 20 with a grade of B)				
		II	MWF	203F	Ar
70f-71w-72s†	Survey of French Literature (9 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	201F	Mr. Searles
		III	MWF	201F	Mr. LeCompte
73w-74s†	Survey of French Literature (10 cred.; jr., sr.; prereq. 3-4)				
		III	MTWThF	303F	Mr. Brackney
		VII	MTWThF	226F	Mr. Jordan
80f	French Literature: 19th Century—Chateaubriand and Romantic Poets (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Clefton
81w	French Literature: 19th Century—Romantic Drama and Novel (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Barton
82s	French Literature: 19th Century—Poetry and Drama after 1850 (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Barton, Mr. Clefton
103f-104w-105s†	French Syntax and Composition (3 cred.; jr., sr., grad.; prereq. 63 or registration in 63)				
		VI	F	203F	Mr. Barton

* Prerequisite is 70-71-72 or 73-74.

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

¶ Students who have had three years of high school French may be admitted to Course 20 with the consent of the department.

No.	Title	Hour	Day	Bldg.	Instructor
115f	French Literature: 17th Century—Formation of Classic Ideal (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
116w	French Literature: 17th Century—Molière, Racine, La Fontaine (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
117s	French Literature: 17th Century—Moral and Didactic Literature (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
118f-119w-120s	French Literature: 18th Century (9 cred.; jr., sr., grad.; prereq.*)	III	TThS	209½F	Mr. Sirich
121-122-123	*French Literature: 16th Century* (9 cred.; jr., sr., grad.; prereq. 9 cred. in literature courses above 74) *(Not offered)*				
130	*French Romantic Poetry—Victor Hugo* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
131f	Parnassian Poetry (3 cred.; jr., sr., grad.; prereq.*)	II	TThS	227F	Mr. Clefton
132w	Verlaine, Rimbaud, and the Symbolists (3 cred.; jr., sr., grad.; prereq.*)	VII	MWF	202F	Mr. LeCompte
145f	French Drama, 1890-1915 (2 cred.; jr., sr., grad.; prereq.*)	III	TTh	203F	Mr. Barton
146w-147s	Contemporary French Dramatic Literature (4 cred.; jr., sr., grad.; prereq.*)	III	TTh	203F	Mr. Barton
149s	Explication de Textes (3 cred.; jr., sr., grad.; prereq.*)	II	TThS	202F	Mr. LeCompte
153	*Contemporary French Lyric Poetry* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
156w	French Realistic Novel (3 cred.; jr., sr., grad.; prereq.*)	VIII	MWF	201F	Mr. Minault
157	*French Novel, 1880-1915* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
158s	Contemporary French Novel (3 cred.; jr., sr., grad.; prereq.*)	VIII	MWF	201F	Mr. Minault
171f-172w-173s†	History of French Language (3 cred.; jr., sr., grad.; prereq. one year of Latin or permission of instructor)	VIII	Th	203F	Mr. LeCompte

Seminars

201f-202w-203s	Old French Phonology and Morphology (6 cred.)	Ar	Ar	203F	Mr. LeCompte
204f-205w-206s	Reading in Old French Literature (6 cred.)	Ar	Ar	203F	Mr. LeCompte
207f-208w-209s	Old Provençal (6 cred.)	Ar	Ar	203F	Mr. LeCompte
222f-223w-224s	French Seminar: Classical Period (6 cred.)	VIII, IX	W	203F	Mr. Searles

ITALIAN

Junior College Courses

1f-2w†¶	Beginning Italian (10 cred.; all; no prereq.)	IV	MTWFS	226F	Miss Nissen
3s	Intermediate Italian (5 cred.; all; prereq. 1-2)	IV	MTWFS	226F	Miss Nissen
4	*Intermediate Italian* (5 cred.; all; prereq. 1-2) *(Not offered)*				
5w¶	Reading Knowledge of Italian (5 cred.; all; prereq. knowledge of French, Latin, or Spanish. No previous knowledge of Italian is necessary)	VI	MTWThF	108F	Miss Nissen

* Prerequisite is 70-71-72 or 73-74.

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

¶ Credit will not be given for both Course 1 and Course 5.

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

No.	Title	Hour	Day	Bldg.	Instructor
69	*Survey of Italian Literature I* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
70f	Survey of Italian Literature II (3 cred.; jr., sr.; prereq.§)	III	MWF	302F	Miss Nissen
71	*Modern Poetry (Leopardi, Carducci)* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
72w	Modern Drama (Giacosa, Bracco, Pirandello) (3 cred.; jr., sr.; prereq.§)	III	MWF	302F	Miss Nissen
73	*Boccaccio* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
74s	Petrarch (3 cred.; jr., sr.; prereq.§)	III	MWF	302F	Miss Nissen
159-160	*Dante* (6 cred.; jr., sr., grad.; prereq. one course above 50) *(Not offered)*				
161f-162w	The Sixteenth Century (6 cred.; jr., sr., grad.; prereq. one course above 50)	II	MWF	108F	Miss Nissen

Courses for Which No Knowledge of Italian Is Required

164 *Dante (in English)* (3 cred.; jr., sr., grad.; prereq. French 70-71-72 or 73-74, or 6 cred. in English above 50, or Hist. 53-54, or Spanish 65-66-67 or 68-69) *(Not offered)*

SPANISH

Junior College Courses

1f-2w†	Beginning Spanish (10 cred.; all; no prereq.)	I	MTWThF	226F	Ar
		IV	MTWFS	201F	Ar
		VI	MTWThF	201F	Ar
1w-2s†	Beginning Spanish (See 1f-2w)	VII	MTWThF	109F	Ar
1s	Beginning Spanish (1st qtr. of 1-2. See 1f-2w)	II	MTWThF	226F	Ar
2f	Beginning Spanish (2nd qtr. of 1-2. See 1f-2w)	III	MTWThF	202F	Ar
3f-4w	Intermediate Spanish (10 cred.; all; prereq. 1-2 or two years of high school Spanish. Students who have had three years of high school Spanish will omit Course 3 and take Course 4)	II	MTWThF	226F	Ar
		VI	MTWThF	124F	Ar
3w-4s	Intermediate Spanish (See 3f-4w)	III	MTWThF	202F	Ar
3s	Intermediate Spanish (1st qtr. of 3-4. See 3f-4w)	I	MTWThF	226F	Ar
		IV	MTWFS	201F	Ar
		VI	MTWThF	201F	Ar
4f	Intermediate Spanish (2nd qtr. of 3-4; prereq. 3, or three years of high school Spanish)	II	MTWThF	202F	Ar
		VI	MTWThF	227F	Ar
20s	Oral and Written Spanish (5 cred.; all; prereq. 4 or four¶ years of high school Spanish)	III	MTWThF	227F	Ar
30s	Spanish Commercial Correspondence (3 cred.; all; prereq. 3)	VII	MWF	205F	Ar

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

§ The prerequisite is Course 3 or Course 4; but for students beginning Italian in the Senior College it may be Course 1-2 or 5 with permission of the instructor.

¶ Students who have had three years of high school Spanish may be admitted to Course 20 with the consent of the department.

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

No.	Title	Hour	Day	Bldg.	Instructor
50w	Spanish Pronunciation (3 cred.; jr., sr.; prereq. 4)	III	TThS	302F	Ar
51	*Advanced Spanish Pronunciation and Diction* (3 cred.; jr., sr.; prereq. 50) *(Not offered)*				
53f	Spanish Composition (3 cred.; jr., sr.; prereq. 3-4)	II	MWF	304F	Ar
54w-55s	Spanish Conversation—Based on Spanish-American life (4 cred.; jr., sr.; prereq. 53 or 20)	II	MWF	304F	Ar
60f	Advanced Spanish Composition (3 cred.; jr., sr.; prereq. 53 or 20 with grade of B)	VII	MWF	227F	Mr. LeFort
61w-62s	Advanced Spanish Conversation (6 cred.; jr., sr.; prereq. 54-55 or 20 with grade of B)	VII	MWF	227F	Mr. LeFort
68w-69s†	Survey of Spanish Literature (10 cred.; jr., sr.; prereq. 3-4)	VI	MTWThF	227F	Mr. Pattison
70w-71s†	Latin American Culture (6 cred.; jr., sr.; prereq. 4)	III	MWF	203F	Ar
74f-75w-76s†	Survey of Spanish American Literature: Contemporary Prose and Poetry (9 cred.; jr., sr.; prereq. 3-4)	II	TThS	108F	Mr. LeFort
110-111-112	*Spanish Literature: 19th Century* (9 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
115-116-117	*Spanish Literature: 17th Century* (9 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
120	*The Ballad* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
130	*Cervantes: Don Quijote* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
131	*The Picaresque Novel* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
140	*Rubén Darío and the Contemporary Movement in Spanish American Literature* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
155f-156w-157s	Spanish Literature: 16th Century (9 cred.; jr., sr., grad.; prereq.*)	II	MWF	316F	Mr. Grismer
174f-175w-176s	Contemporary Spanish Literature (9 cred.; jr., sr., grad.; prereq.*)	IV	MWF	108F	Mr. Pattison

Seminars

241f-242w-243s	Old Spanish Philology (6 cred.)	Ar	Ar	Ar	Mr. Grismer
244-245-246	*Readings in Old Spanish Literature* (6 cred.) *(Not offered)*				
250-251-252	*Spanish Seminar. Don Quijote and the Minor Works of Cervantes* (6 cred.) *(Not offered)*				

SCANDINAVIAN

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w	Beginning Norwegian (10 cred.; all; no prereq.)	I	MTWThF	206F	Mr. Landa
3s	Intermediate Norwegian (5 cred.; all; prereq. 1-2 or equiv.)	I	MTWThF	206F	Mr. Landa
4f-5w-6s	Advanced Norwegian (9 cred.; all; prereq. 1-2-3 or equiv.)	III	MWF	206F	Mr. Landa
7f-8w	Beginning Swedish (10 cred.; all; no prereq.)	II	MTWThF	206F	Mr. Gustafson

* The prerequisite is 68-69 or 74-75-76.

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

No.	Title	Hour	Day	Bldg.	Instructor
9s	Intermediate Swedish (5 cred.; all; prereq. 7-8 or equiv.)	II	MTWThF	206F	Mr. Gustafson
10f-11w-12s	Advanced Swedish (9 cred.; all; prereq. 7-8-9 or equiv.)	IV	MWF	206F	Mr. Gustafson

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51f*	Scandinavian Literature in the 19th Century (2 cred.; jr., sr.; prereq. 4-5-6 or 10-11-12 or 15 cred. in literature)	IV	TS	206F	Mr. Gustafson
52w*	Characteristic Trends in Contemporary Scandinavian Literature (2 cred.; jr., sr.; prereq. 4-5-6 or 10-11-12 or 15 cred. in literature)	IV	TS	206F	Mr. Gustafson
61s*	The Modern Scandinavian Novel (2 cred.; jr., sr.; no prereq.)	IV	TS	206F	Mr. Gustafson
192f	Gothic—Introduction to Germanic Linguistics (Identical with German 192) (4 cred.; sr., with completed major sequence, grad.)	VI	MWThF	209½F	Mr. Reichardt
195w	Introduction to Old Norse Language and Literature (Identical with German 195) (4 cred.; sr., grad.; prereq. 192 or permission of instructor)	VI	MWThF	209½F	Mr. Reichardt
196s	Eddic Poetry (Identical with German 196s) (3 cred.; sr., grad.; prereq. 195)	VII	MWF	209F	Mr. Reichardt

For Graduate Students Only

215f-216w-217s	Studies in Scandinavian Romanticism	Mr. Gustafson
221f-222w-223s	Biographical Problems in Strindberg—Individual investigation under supervision of the instructor.	Mr. Gustafson

SOCIOLOGY AND SOCIAL WORK

Major advisers in the College of Science, Literature, and the Arts.—Professors Chapin, Kirkpatrick, Nelson, and Vold; Associate Professors Fenlason, Shea, and Vaile; Assistant Professors Monachesi and Sletto; Lecturers Doyle and Phillips.

Major sequences in the College of Science, Literature, and the Arts.—

Sequence A. General sociology. Course 53; two of 100, 101, 103; two of 115, 116, 119, 160; 123 or 161; 120, 140, 145; 110 or 112 or 114; 102 or 105 or 132.

Sequence B. Applied sociology. Courses 53, 60, 90; two of 100, 101, 102, 103; two of 115, 116, 119, 160; 120 or 123 or 161; 110 or 112 or 114; 132 or 146 or 147.

Sequence C. Rural sociology. Courses as follows: two of 53, 60, 90; two of 100, 101, 103; two of 115, 116, 119, 160; 123 or 161; 120 or 140 or 145; 110, 112, 114.

Sequence D (leading to the B.S. degree). Presocial work. (The undergraduate sequence leading to the course in graduate social work—see the Bulletin of the College of Science, Literature, and the Arts); Courses 53, 60, 90, 119; Preventive Medicine 50 or 51 or 53, and one other Senior College course in Preventive Medicine; six credits in Senior College courses in psychology, preferably Psychology 144-145; Home Economics 30 or 89; Economics 82, 83, 84 (unless the student has had Economics 6-7, Principles of Economics, or its equivalent); nine credits from Courses 100, 101, 102, 103, 110, 114, 115, 120, 123, 160.

(Prerequisites: For Sequences A, B, C, Soc. 1 and a total of 20 credits from courses in sociology, anthropology, education, history, philosophy, political science, psychology, and

* No knowledge of Scandinavian languages is required.

zoology. For Sequence D, see the Junior College part of the presocial work curriculum in the Bulletin of the College of Science, Literature, and the Arts.)

Modification of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Kirkpatrick.

Requirements for a teacher's certificate.—Major recommendation: 36 credits including 1, 6, and 14.

Minor recommendation: 19 or 20 credits including 1, 6, and 14.

Note.—Students majoring in sociology must complete two teaching minors in addition to the required professional courses. Teachers who already hold a teacher's certificate may be relieved of this requirement upon petition.

For a specialized curriculum in social studies and a curriculum for "Visiting Teachers" see the Bulletin of the College of Education.

Preparation for professional social work.—See the presocial work course described in the Bulletin of the College of Science, Literature, and the Arts and the professional social work course described in the Bulletin of the Graduate School; also the special bulletin on graduate social work published by the department.

Honors course.—Students interested in the work of an honors course should consult the chairman of the department.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,w	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.)				
	Lect.	I	TThS	BuAud	Mr. Monachesi
	Sec. 1	I	WF	109J	and others
	2	III	MW	110P	
	3	IV	MW	209EdH	
	4	V (fall only)	MW	109J	
	5	VI	MW	109J	
	6	VII	MW	2J	
	7	III	TTh	209Bu	
1f,w	Introduction to Sociology (For students of the College of Agriculture, Forestry, and Home Economics only) (3 cred.; no prereq.)				
		III	TThS	204OD	Mr. Nelson
1s	Introduction to Sociology (See 1f)				
	Lect.	I	TThS	BuAud	Mr. Monachesi
	Rec. Secs. 1	I	WF	2J	and others
	2	III	MW	208P	
	3	IV	MW	109J	
	4	VI	MW	109J	
	5	III	TTh	209Bu	
1s	Introduction to Sociology (For students of the College of Agriculture, Forestry, and Home Economics only) (3 cred.; no prereq.)				
		I	TThS	204OD	Mr. Nelson
6f,w	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., sr.; prereq. 1. This course is not open to students who have had Soc. 100 or Psy. 140)				
		II	MWF	JAud	Mr. Kirkpatrick
6s	Social Interaction (See 6f)				
		III	MWF	JAud	Mr. Kirkpatrick

No.	Title	Hour	Day	Bldg.	Instructor
14f,w,s	Rural Sociology—A presentation of factual data necessary to an understanding of the problems of rural social life (3 cred.; soph., jr., sr.; prereq. 1)	IV	MWF	JAud	Mr. Nelson
14f,w	Rural Sociology (For students of the College of Agriculture, Forestry, and Home Economics) (3 cred.; soph., jr., sr.; prereq. 1 or jr. class)	I	TThS	116SnH	Mr. Nelson
45f	Social Statistics (5 cred.; soph., jr., sr.; prereq. 1. Not open to students who have received credit in Econ. 5)				
	Lect.	IV	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
45w	Social Statistics (See 45f)				
	Lect.	VI	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
45s	Social Statistics (See 45f)				
	Lect.	III	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
49f,w,s	Social Pathology (3 cred.; 3rd qtr. soph., jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.)	I	MWF	301F(f), BotAud(w) BuAud(s)	Mr. Sletto

Senior College Courses

Course 53 is open to third quarter sophomores who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

COURSES IN SOCIOLOGY

53f,w,s	Elements of Criminology—A general survey of the field of criminology (3 cred.; jr., sr.; prereq. same as for 49)	III	MWF	104J(f) 109J(w,s)	Mr. Vold
57f	Leisure in the Modern World (3 cred.; open only to students in the College of Education; prereq. Soc. 1 or equiv.)	II	MWF	206Pt	Mrs. May
60s	Social Protection of the Child (3 cred.; sr. only; prereq. 49)	I	TThS	104J	Mrs. Shea
90f,w	Survey of Social Work (5 cred.; sr. only; prereq. 49)	III	MWF	209Bu	Miss Phillips
		VII, VIII	TTh		
97f-98w-99s	Tutorial and Honors Work in Selected Fields (9 cred.; jr., sr.; prereq. consent of major adviser in sociology)	Ar	Ar	Ar	Ar
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.)	II	TThS	109J	Mr. Kirkpatrick
101f	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.)	III	MWF	109J	Mr. Chapin
102s	Contemporary Penology (3 cred.; jr., sr., grad.; prereq. same as for 101, but including 53 or consent of the instructor)	II	MWF	9F	Mr. Vold
103w	Sociology of Conflict (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	TThS	104J	Mr. Vold
105f	Criminological Theories—Historical and Contemporary (3 cred.; jr., sr., grad.; prereq. same as for 101, but including 53 or consent of instructor)	IV	MWF	109J	Mr. Vold
110f	Rural Organization (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	MWF	2J	Mr. Nelson

No.	Title	Hour	Day	Bldg.	Instructor
112s	Methods of Rural Social Research (2 cred.; grad.*; prereq. same as for 101)	I	MW	204OD	Mr. Nelson
114w	Rural Social Institutions (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	MWF	9F	Mr. Nelson
115w	Religion As a Social Institution (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	MWF	104J	Mr. Kirkpatrick
116	*The Newspaper As a Social Institution* (3 cred.; jr., sr., grad.; prereq. same as for 101) *(Not offered)*				
119f	The Family (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	TThS	109J	Mr. Kirkpatrick
119s	The Family (See 119f)	II	MWF	109J	Mr. Kirkpatrick
120f	Social Life and Cultural Change (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	MWF	109J	Mr. Schneider
122s	Statistical Methods (3 cred.; grad.*; prereq. 4 courses in soc.)	II	TThS	104J	Mr. Chapin
123s	Methods of Social Research (3 cred.; jr., sr., grad.; prereq. Soc. 45 or equiv.)	III	TThS	104J	Mr. Sletto
132f	Juvenile Courts and Probation (3 cred.; grad.*; prereq. 53, 102)	III	TThS	104J	Mr. Monachesi
140w	History of Social Theory (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	MWF	200Pt	Mr. Schneider
145s	Contemporary Sociological Theory (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	TThS	2J	Mr. Schneider
146f¶	Community Organization and the Social Setting of Recreation (3 cred.; jr., sr., grad.; prereq. for Arts College students, 3 courses in soc.; for students in Education, 3 courses in soc. sci., including Soc. 57)	III	MWF	206Pt	Mrs. May
147w¶	Group Leadership in Recreation (3 cred.; jr., sr., grad.; prereq. Soc. 146 or equiv.)	II	MWF	211Bu	Mrs. May
148s¶	Supervisory Problems in Recreation (3 cred.; jr., sr., grad.; prereq. Soc. 147 or equiv.)	III	MWF	2J	Mrs. May
160w	Population Problems (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	TThS	109J	Mr. Sletto
161w	Social Aspects of Housing and Standards of Living (3 cred.; sr., grad.; prereq. same as for 101)	II	MWF	109J	Mr. Chapin

COURSES IN SOCIAL WORK

109f,w,s§	The Field of Social Work (3 cred.; grad.*; prereq. same as for 101, or consent of adviser and instructor)				
	Fall	VIII	T	109J	Mrs. Doyle
		VIII, IX	Th	109J	
	Winter	I	TThS	104J	
	Spring	Ar	Ar	Ar	
122s	Statistical Methods (This course is listed under the hearing "Courses in Sociology" above)				
125f,w	Principles of Group Work (3 cred.; grad.*; prereq. 109, which may be taken simultaneously, or equiv.)	I	MWF	2J	Miss Phillips
126s	Problems of Supervision in Group Work (3 cred.; grad.*; prereq. 125, 156)	II	MWF	200Pt	Miss Phillips
127s	Legal Aspects of Social Work (3 cred.; grad.*; prereq. 109, which may be taken simultaneously)	I	MWF	109J	Mr. Finke

* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and instructor.

§ This course is for mature students who have not had Courses 49 and 90.

¶ Open only to majors in sociology and social work or recreation.

No.	Title	Hour	Day	Bldg.	Instructor
128s	Principles of Administration, Publicity, and Finance Applied to Social Work (3 cred.; grad.*; prereq. same as for 101, but including 109 or equiv.)	VIII, IX and one hr. ar.	Th	104J	Mr. Atwater
129f-130w†	Principles of Social Case Work (6 cred.; grad.*; prereq. for 129 is 109, which may be taken simultaneously, prereq. for 130 is 129, 153)	III	TThS	2J	Mrs. Fenlason
129w-130s†	Principles of Social Case Work (See 129f-130w)	II	TThS	2J	Mrs. Fenlason
131s	Rural Social Work (3 cred.; grad.*; prereq. 129, 153, 114 or equiv.)	I	TThS	2J	Miss Vaile
132f	Juvenile Courts and Probation (This course is listed under the heading "Courses in Sociology," on page 98)				
133s	Social Case Work in Health Problems (3 cred.; grad.*; prereq. 129, 136)	III	TThS	200Pt	Ar
134	*Legal Protection of the Child* (3 cred.; grad.*; prereq. same as for 101 but incl. 60) *(Not offered)*				
135f	Survey of Social Work for Children (3 cred.; grad.*; prereq. 109, which may be taken simultaneously, or equiv.)	IV	TS	2J	Mrs. Shea
		VII	Th		
136w	Essentials of Medicine for Social Workers (3 cred.; grad.*; prereq. P.M.&P.H. 50 or 51 or equiv.)	VIII,IX	T	Ar	Med. Staff U.H.
		IX	Th		
137f	The History and Theory of Social Work (3 cred.; grad.*; prereq. 109, which may be taken simultaneously)	III	TThS	200Pt	Ar
138w	Case Work with Children (3 cred.; grad.*; prereq. 129, 153)	III	TThS	109J	Mrs. Shea
139s	Psychiatric Problems in Social Case Work (3 cred.; grad.*; prereq. 130, 154 or 221 and 170 or Psy. 144-145)	III	TThS	109J	Mrs. Shea
151f-152w†	Public Welfare (6 cred.; grad.*; prereq. 109 or equiv.)	I	TThS	109J	Miss Vaile
151w-152s†	Public Welfare (See 151f-152w)	IV	TS	109J	Miss Vaile
		VII	Th	109J	
153f,w,s‡-154f,w,s‡-155f,w,s‡	Field Training in Case Work (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 129, which may be taken simultaneously or equivalent)	Ar	Ar	Ar	Mrs. Doyle
156f,w,s‡-157f,w,s‡-158f,w,s‡	Field Training in Group Work (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 125, which may be taken simultaneously)	Ar	Ar	Ar	Miss Phillips
161w	Social Aspects of Housing and Standards of Living (This course is listed under the heading "Courses in Sociology," on page 98)				
170f	Introductory Psychiatry (Identical with Med. 130) (3 cred.; grad.*; no prereq.)	III	TThS	Ar	Dr. de Berry
171w	Descriptive Neuropsychiatry (Identical with Med. 131) (3 cred.; grad.*; prereq. 170 or equiv.)	4:00 to 5:00	MWF	Ar	Dr. Baker
172s	Advanced Considerations in Psychiatry (Identical with Med. 132) (1 cred.; grad.*; prereq. 171 or equiv.)	IV	T	Ar	Dr. Clarke

* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and instructor.

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

‡ A fee of $3.50 is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
173f	Behavior Problems (Identical with C.W. 140) (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	I, II	S	202Pt	Miss Goodenough
197f-198w-199s	Special Topics in Social Work (Cred. ar.; grad.*)	Ar	Ar	Ar	Ar

For Graduate Students Only

COURSES IN SOCIOLOGY

200f-w-s	Seminar: Topics in Criminology	Mr. Vold
201f-w-s	Seminar: Topics in Social Psychology	Mr. Kirkpatrick
202f-w-s	Seminar: Topics in Urban Sociology	Mr. Sletto
203f-204w-205s	Seminar in Social Theory	Staff
206f-207w-208s	Seminar: Statistical Theory in Relation to Social Theory and Practice	Mr. Chapin
209f-210w-211s	Seminar: The Theory of Social Evolution	Staff
215f-216w-217s	Seminar in Rural Sociology	Mr. Nelson
234w,s	Seminar in Juvenile Delinquency and Treatment	Mr. Monachesi
238w-239s	Principles of Sociology (6 cred.; grad.)	Mr. Monachesi

COURSES IN SOCIAL WORK

218f-w-s	Seminar in Family Case Work	Mrs. Fenlason
219f-w-s	Seminar in Case Work with Children	Mrs. Shea
220f-w-s	Seminar in Medical Social Work	Ar
221f,w,s‡-222f,w,s‡-223f,w,s‡	Graduate Field Training	Staff
224f-225w-226s	Advanced Medical Social Work	Ar
227f,w,s‡-228f,w,s‡-229f,w,s‡	Advanced Field Training	Staff
230f-w-s	Seminar in Public Welfare	Miss Vaile
231f-w-s	Seminar in Group Work	Miss Phillips
232f-w-s	Seminar in Rural Social Work	Miss Vaile
233f-w-s	Seminar in Social Agencies and Social Institutions	Mrs. Doyle
234w-s	Seminar in Juvenile Delinquency and Treatment (This course is listed under the heading "Courses in Sociology," see above)	Ar
235f-w-s	Thesis Preparation	Staff
236f-w-s	Research Topics in Social Work	Staff
237f,w,s	Recent Research in Social Work	Mrs. Shea

SPANISH

See Romance Languages, page 89

SPEECH

Major advisers in the College of Science, Literature, and the Arts.—Professor Rarig; Associate Professor Bryngelson, Assistant Professor Lees.

Major sequences in the College of Science, Literature, and the Arts.—

A. Courses 55-56-57; 61, 67; 101-102; 105; 81-82-83.

B. Courses 31-32-33; 77-78-79 or 91-92-93; 81-82-83; 111-112-113.

C. Courses 61; 67; 121-122; 162-163; Psychology 125-126 and 144-145.

(Prerequisites: 1-2-3 or 5-6; Psychology 1-2. Physiology 2 required for Sequence C.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and the instructor.

‡ A fee of $3.50 per quarter is charged for this course.

Major advisers in the College of Education.—Professor Rarig; Associate Professor Bryngelson.

Requirements for a teacher's certificate.—Major recommendation: Speech 1-2-3 or 5-6; 31-32, 55-56, 61, 67, 81-82, 121-122; total, 39 or 40 credits. Psychology 4-5 advised.

Minor recommendation: 1-2-3 or 5-6; 61 and 67; 31-32-33 or 55-56-57 or 81-82-83.

Minor recommendation in Speech Correction: 1-2-3 or 5-6, 61, 67, 162-163, Psychology 52, Child Welfare 80.

All students majoring or minoring in speech must present satisfactory evidence of interest and effective participation in one or more activities, such as debating, dramatics, oratory, public reading, or public speaking.

Because of the close relation between English and speech in the high schools of Minnesota, students majoring in speech should have a minor in English as well as one other minor.

Students majoring in speech should register for Special Methods and Directed Teaching in English, Ed.T. 66A-66B-66C as well as Special Methods and Directed Teaching in Speech, Ed.T. 88A-88B-88C. See the program of the College of Education.

Students interested in preparing for clinical work in speech correction in public schools should read the statement of the specialized curriculum in "Speech Pathology" in the Bulletin of the College of Education.

Note.—The University maintains a clinical service for students with speech defects. Students who desire treatment should consult the director of the Speech Clinic, 411 Folwell Hall. The clinic also accepts a limited number of full-time outpatients who pay a fee of $50 per quarter. Part-time outpatients pay $30 per quarter.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s*†‡	Fundamentals of Speech (9 cred.; soph., jr., sr.; prereq.* Eng. A-B-C or Comp. 4-5-6 or exemption)				
	Sec. 1	I	MWF	308F	Mr. Gilkinson
	2	II	MWF	311F	and others
	3	III	MWF	306F	
	4	VI	MWF	308F	
	5	I	TThS	305F	
	6	II	TThS	308F	
	7	III	TThS	308F	
	8 (Child Welfare majors)	VII (f,w only)	MWF	308F	Ar
1w-2s*‡	Fundamentals of Speech (2 qtrs. of 1-2-3. See 1f-2w-3s)				
		II	MWF	227F	Ar
	(For dental hygiene students only)	VI	MWF	5F	
3f*‡	Fundamentals of Speech (3rd qtr. of 1-2-3. See 1f-2w-3s)				
		II	MWF	308F	Ar
5f-6w*†‡	Fundamentals of Speech (10 cred.; soph., jr., sr.; prereq.* Eng. A-B-C or Comp. 4-5-6 or exemption)				
	Sec. 1	III	MTWThF	311F	
	2	IV	MTWFS	303F	
	3	VI	MTWThF	6F	
5w-6s*†‡	Fundamentals of Speech (See 5f-6w)				
	Sec. 1	IV	MTWFS	311F	
	2	VI	MTWThF	306F	
5s*‡	Fundamentals of Speech (1st qtr. of 5-6. See 5f-6w)				
	Sec. 1	III	MTWThF	311F	
	2	IV	MTWFS	305F	

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission.

† To receive credit for any part of this course a student must complete the parts preceding the the dagger. Exception:—Students in Education not majoring in Speech may receive credit for Course 1-2.

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

No.	Title	Hour	Day	Bldg.	Instructor
6f*‡	Fundamentals of Speech (2nd qtr. of 5-6. See 5f-6w)				
	Sec. 1	IV	MTWFS	305F	
	2	VI	MTWThF	305F	
31f-32w-33s‡‡	Introduction to the Theater (9 cred.; soph., jr., sr.; prereq. 1-2-3 or 5-6 or concurrent registration therein)				
		I	MWF	19Mu	Mr. Whiting

Senior College Courses

Courses 51, 67, 81-82-83 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

51s‡	Advanced Public Speaking (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		II	MWF	308F	Ar
55f-56w-57s†‖	Argumentation and Debating (9 cred.; jr., sr.; prereq. 1-2-3 or 5-6; Phil. 2, Logic, is recommended)				
		VI	T	308F	Mr. Knower
		VI, VII	Th	308F	Mr. Knower
61f	Speech Correction (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; Psy. 1-2)				
		VI	MWF	306F	Mr. Bryngelson
65s‡	Radio Speech—Speech arts and psychology of the radio. Announcing and broadcasting. The radio speech. Radio drama and interpretative reading, voice, diction, articulation, pronunciation. Practice, exercises, projects, and reports on problems of appeal and audience response. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		VIII	MWF	409F, 308F	Mr. Ziebarth
67f,s‡¶	Phonetics (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		II	MWF	306F	Miss Hurd
77f-78w-79s‡‡	Acting (9 cred.; jr., sr.; prereq. 1-2-3 or 5-6, 31-32-33, and consent of instructor)				
		III	MWF	19Mu	Mr. Erekson
81f-82w-83s‡	Interpretative Reading (9 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		IV	MWF	308F	Mr. Rarig
81w-82s‡	Interpretative Reading (See 81f-82w-83s)				
		I	TThS	308F	Mr. Rarig
83f‡	Interpretative Reading (3rd qtr. of 81-82-83. See 81f-82w-83s)				
		I	TThS	308F	Mr. Rarig
91f-92w-93s†‡‡	Stagecraft (9 cred.; jr., sr.; prereq. 31-32-33)				
		VI	MWF	19Mu	Mr. Whiting
97f,w,s	Intercollegiate Oratory and Debate (3 cred.; jr., sr.; prereq.§)				
		Ar	Ar	308F	Mr. Rarig, Mr. Knower
101f-102w†	Persuasion (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; Psy. 1-2; 10 cred. in soc. sci.)				
		III	MWF	308F	Mr. Gilkinson
105	*Theory of Reading and Acting* (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; 81-82-83, and Psy. 1-2) *(Not offered)*				
107s‡	Platform Reading—An advanced course in the oral reading of literature. Speech melody, rhythm, platform technique. Problems in critical appreciation. Lecture recitals (3 cred.; prereq. 81-82-83 with grade of B in 83)				
		Ar	Ar	Ar	Mr. Rarig

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission.

† 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.

‡‡ A fee of $3 per quarter is charged for this course.

§ Open to representatives of the University in the Northern Oratorical League and to members of the intercollegiate debate squad.

¶ Students intending to take Speech Pathology should take Phonetics the preceding spring.

‖ Majors in Speech in the College of Education are required to complete only two quarters each of Courses 31-32-33 and 55-56-57.

No.	Title	Hour	Day	Bldg.	Instructor
109s*	Classical Rhetoric—The place of rhetoric in classical culture; the Sophists; Aristotle, Cicero, Quintilian (3 cred.; jr., sr., grad.; prereq. 101-102, Psy. 140)	III	MWF	308F	Mr. Rarig
111f-112w-113s†‡‡	Stage Direction (9 cred.; sr., grad.; prereq. 31-32-33, 91-92-93)	VII	MWF	19Mu	Mr. Lees
115f-116w-117s	Playwriting and Production (1 to 3 cred. per qtr.; sr., grad.; prereq. 31-32-33 and permission of instructor)	III	MWF	109Mu	Mr. Lees
121w-122s†‡	Advanced Speech Problems (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6, Psy. 1-2)	II	TThS	305F	Mr. Knower
141-142-143‡	*Voice Science* (9 cred.; jr., sr., grad.; prereq. 1-2-3, Psy. 1-2 and 4-5) *(Not offered)*				
162w-163s†‡¶	Speech Pathology (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; 61, 67; and permission of instructor)	VI VII	TTh T	406F	Mr. Bryngelson
164f-165w-166s	Clinical Methods and Practice in Speech Pathology (9 cred.; sr., grad.; prereq. 1-2-3; 61, 67, 162, and Ed.Psy. 142. May be taken simultaneously with Sp. 163)	III and ar	TTh	406F	Mr. Bryngelson
171f-172w-173s	History of the Theater (9 cred.; sr., grad.; prereq. 1-2-3 or 5-6; 31-32-33)	IV	MWF	19Mu	Mr. Lees
181f-182w-183s	Readings in Speech—Directed reading and the preparation of reports on selected subjects (Cred. ar.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and six additional credits and consent of instructor)	Ar	Ar	Ar	Mr. Rarig, Mr. Bryngelson, Mr. Gilkinson, Mr. Knower, Mr. Lees
191f-192w-193s‡	Technical Stage Problems—Advanced problems in design and construction; stage management, wiring, color effects. Special problems are assigned to individual students (3 cred.; jr., sr., grad.; prereq. 91-92-93)	IV	MWF	109Mu	Mr. Lees, Mr. Whiting

For Graduate Students Only

201f,w,s	General Seminar	Ar	Ar	Ar	Staff
207f-208w-209s	Seminar in Orators	Ar	Ar	Ar	Mr. Rarig
211f-212w-213s	Seminar in Dramatic Theory	Ar	Ar	Ar	Mr. Lees
261f-262w-263s	Seminar in Speech Pathology	Ar	Ar	Ar	Mr. Bryngelson
291f-292w-293s	Research in Special Problems	Ar	Ar	Ar	Mr. Rarig, Mr. Bryngelson, Mr. Gilkinson, Mr. Knower, Mr. Lees

SWEDISH

See Scandinavian, page 94.

ZOOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Minnich.

Major sequences in the College of Science, Literature, and the Arts.—

A. In Zoology, 27 credits in Senior College courses of which at least 18 must be in courses with numbers between 49 and 100.

* This course and Course 105s, Theory of Reading and Acting, are offered in alternate years.

† 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.

‡‡ A fee of $3 per quarter is charged for this course.

¶ Students intending to take Speech Pathology should take Phonetics the preceding spring.

B. In special fields, as cytology, ecology, embryology, entomology, genetics, histology, parasitology, physiology, or protozoology, a major will consist of the respective one-hundred courses, 5 or more credits in a problem course in the special field, and additional credits in approved courses to make a total of 27 credits in Senior College courses.

(Prerequisites: 1-2-3, or equivalent and 21, 22, or equivalent. If possible beginning chemistry and at least one year of French or German should be completed during the Junior College work.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major advisers in the College of Education.—Professor Wodsedalek and Associate Professor Ringoen.

Requirements for a teacher's certificate.—Major recommendation: General Zoology, Zoology 52, 53, 75, 83 and Physiology 4.

Minor recommendation: A minimum of 18 credits including General Zoology, Zoology 53 and 75.

For a specialized curriculum in Natural Science see College of Education Bulletin.

Honors Course in Zoology.—A student who has met all of the requirements for admission to the Senior College and who has maintained a grade of B in his work in the department may enroll for the Honors Course in Zoology. Such a student will carry at least twelve hours of problem work in some special phase of the work and will pursue under the direction of his adviser such special reading and outline courses as may be required. The completion of the Honors Course will require a reading knowledge of either French or German.

Courses in human anatomy, embryology, and hematology may be arranged for with the head of the Department of Anatomy.

Courses in physiology may be arranged for with the head of the Department of Physiology.

Junior College Courses

No.	Title		Hour	Day	Bldg.	Instructor
1f-2w-3s*†‡	General Zoology (10 cred.; all; no prereq.)					
	Lect.	Sec. 1 (Limited to 320)	II	TTh	06Bo	Mr. Minnich
		2 (Limited to 320)	IV	TS	06Bo	Mr. Dawson
		3 (Limited to 320)	III	WF	06Bo	Mr. Wodsedalek
		4 (Limited to 240)	IV	WF	06Bo	Mr. Olson
	Lab.	Sec. 1 (Limited to 150)	I, II	MF	101Z	Ar
		2 (Limited to 174)	III, IV	MF	101Z	Ar
		3 (Limited to 174)	VI, VII	MF	101Z	Ar
		4 (Limited to 174)	VIII, IX	MF	101Z	Ar
		5 (Limited to 174)	I, II	TS	101Z	Ar
		6 (Limited to 174)	III, IV	TS	101Z	Ar
		7 (For Forestry students only. Limited to 60)				
			V, VI	TTh	101Z	Ar

* Lectures may be elected without laboratory with the consent of the chairman of the department. Laboratory must be taken with the lectures, however, if zoology is offered as the required laboratory science. Students should elect lecture sections in which they can continue throughout the three quarters. Changes from one lecture or laboratory section to another may be made only with the consent of the department office.

† 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.

No.	Title	Hour	Day	Bldg.	Instructor
14f-15w†‡	General Zoology (For students of the College of Agriculture, Forestry, and Home Economics) (6 cred.; all; no prereq.)				
	Lect. (Limited to 228)	VII	TTh	150Ph	Mr. Dawson
	Lab. Sec. 1 (For Agr. and H. E. students. Limited to 114)	V, VI	TTh	101Z	Ar
	2 (For Agr. and H. E. students. Limited to 174)	VIII, IX	TTh	101Z	Ar
21f‡§	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)				
	Lect.	III	TThS	313Z	Mr. Ringoen,
	Lab. Sec. 1	I, II	TThS	201Z	Miss Slider
	2	VI, VII, VIII	TTh	201Z	
	3	I, II	MWF	201Z	
22w‡‡	Comparative Anatomy (5 cred.; soph., jr., sr.; prereq. 1-2-3) (Sections 1 and 2 limited to 40 each, section 3 limited to 30. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	III	TThS	313Z	Mr. Eddy
	Lab. Sec. 1	I, II	TThS	3SZ	
	2	VI, VII, VIII	TTh	3SZ	
	3	VI, VII, VIII	MW	3SZ	
46w-47s†	Ornithology (6 cred.; soph., jr., sr.; prereq. 1-2-3 and permission of instructor)	VI, VII, VIII	MW	204,211Z	Dr. Roberts

Senior College Courses

Courses 50, 51, 52, 53, 81, 82, and 83 are open to sophomores who have a grade of at least C in Course 1-2-3. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 22.

50s‡§	Introduction to General Physiology (5 cred.; soph., jr., sr.; prereq. 1-2-3 or 15 cred. in botany; and 10 cred. in chemistry or permission of instructor) (Sections limited to 20 each)				
	Lect.	III	TThS	211Z	Mr. Clark
	Lab. Sec. 1	I, II	TThS	10Z	
	2	VI, VII, VIII	TTh	10Z	
51f‡	Introductory Animal Parasitology (5 cred.; jr., sr.; prereq. 1-2-3) (Sections are limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	VI	MWF	313Z	Mr. Riley,
	Lab. Sec. 1 (Limited to 80)	VII, VIII	MWF	208Z	Mr. Wallace
	2 (Limited to 40)	I, II	MWF	208Z	
	3 (Limited to 40)	III, IV	MWF	208Z	
52w‡	Introductory Entomology (5 cred.; jr., sr.; prereq. 1-2-3) (Sections limited to 20 each)				
	Lect.	VI	MWF	211Z	Mr. Mickel
	Lab. Sec. 1	VII, VIII	MWF	402Z	
	2	VI, VII, VIII	TTh	402Z	
53s‡	Faunistic Zoology (5 cred.; jr., sr.; prereq. 1-2-3) (Limited to 40. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	VI	MWF	211Z	Mr. Eddy
	Lab.	VII, VIII	MWF	3SZ	
		IX	F	3SZ	
75s‡	Nature Study (3 cred.; jr., sr.; prereq. 15 cred. including 1-2-3. Required of all zoology majors and minors in the College of Education in the junior year)				
		VI, VII, VIII	TTh	208Z	Mr. Wodsedalek

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

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

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

§ Not open to regular three-year premedical and predental students.

No.	Title	Hour	Day	Bldg.	Instructor
81f‡	Marine Invertebrates (3 cred.; jr., sr.; prereq. 1-2-3) (Limited to 24. Written permission must be obtained from the Junior College office, 106 Folwell Hall)	I, II	MWF	211Z	Mr. Dawson
82w	Evolution (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or Bot. 1, 7, 21)	II	MWF	313Z	Mr. Oliver
83s	Introduction to Genetics and Eugenics (3 cred.; jr., sr.; prereq. 1-2-3 or 10 cred. in botany)	II	MWF	313Z	Mr. Oliver
107f‡-108w‡	Protozoology (6 cred.; jr., sr., grad.; prereq. 15 cred.)	I, II	TThS	208Z	Mr. Turner
109f‡-110w‡-111s‡	General Physiology of Animal Reactions (9 cred.; jr., sr., grad.; prereq. 15 cred.)	III, IV	MWF	211Z	Mr. Minnich
117f‡-118w-119s‡¶	Animal Ecology (9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	VI	TTh	211Z(f,s)	Mr. Eddy,
	Lab.	VII, VIII	TTh	3sZ(f,s) 301Ad.UF(w)§	Mr. Hodson
120s¶	General Ecology of Insects (3 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)	VI, VII, VIII	TTh	15AdUF	Mr. Hodson
121f‡	Ichthyology (3 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	VIII, IX	F	211Z	Mr. Eddy
	Lab.	Ar	Ar	Ar	
125f‡-126w‡-127s‡	Advanced Entomology (9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	I	TTh	211Z	Mr. Mickel
	Lab.	I, II, III	S	402Z	
132	*General Physiology of Development* (3 cred.; jr., sr., grad.; prereq. 50 and 180 or consent of instructor) *(Not offered)*				
133	*Genetics of Development* (3 cred.; jr., sr., grad.; prereq. proper preparation in advanced genetics and Course 132, or consent of instructor) *(Not offered)*				
144w‡-145s‡-146s*‡	Animal Parasites and Parasitism (6 or 9 cred.; jr., sr., grad.; prereq. 15 cred.)	VI, VII, VIII	WF	208Z	Mr. Riley, Mr. Wallace
149w‡-150s‡	Histology and Organology (6 cred.; jr., sr., grad.; prereq. 15 cred. in zool.)	VI, VII, VIII	TTh	211Z, 201Z	Mr. Ringoen
160f‡-161w‡	Cytology (6 cred.; jr., sr., grad.; prereq. 15 cred., with the consent of the instructor)	VI, VII, VIII	TTh	104Z	Mr. Wodsedalek
170f‡-171w‡	Advanced Genetics (6 cred.; jr., sr., grad.; prereq. 15 cred. including Course 83, or consent of instructor)	VI, VII, VIII	MW	10Z	Mr. Oliver
180f‡	Comparative Embryology (3 cred.; jr., sr., grad.; prereq. 15 cred. including Course 21 or equiv.)	III, IV	MWF	313Z	Mr. Ringoen
181w	Endocrines and Reproduction (3 cred.; jr., sr., grad.; prereq. 15 cred., including Course 21 or equiv.)	III	MWF	313Z	Mr. Ringoen
182s	Experimental Embryology (3 cred.; jr., sr., grad.; prereq. 15 cred., including Course 21 or equiv.)	III	MWF	313Z	Mr. Ringoen
197f-198w-199s	Problems (5 or more cred.; jr., sr., grad.; prereq. 1-2-3, special requirements)	Ar	Ar	Ar	Ar

* 144w-145s is a 6-credit course. 146s (3 cred.) may be taken simultaneously with 145s, at hours to be arranged.

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

¶ Either 119s or 120s or both may be taken to complete Course 117f-118w.

§ Note that in the winter quarter this course is offered at the University Farm.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Students in this college may elect courses in Entomology and Economic Zoology by arrangement with the department. But before registering for any courses they should get the approval of Assistant Dean Shumway, 219 Administration Building. See the program of the College of Agriculture, Forestry, and Home Economics, in another part of this bulletin.

COURSES IN OTHER COLLEGES

Certain courses in other colleges are open to election by seniors. See the Bulletin of the College of Science, Literature, and the Arts. Students interested in such courses may consult the assistant dean for the Senior College.

COLLEGE OF EDUCATION

Because the regulations and requirements in subject-matter fields and in education necessary for certification in different states are constantly changing, students who plan to teach in states other than Minnesota should consult their major advisers in the College of Education in order that they may fully complete the requirements for the specific state in which they have to teach.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.51Af-51Bw-51Cs†‡	Introduction to Secondary School Teaching (9 cred.; jr.; prereq. 6 cred. in psy. and a C average)				
	Sec. 1	I	MWF	210Bu	Mr. Miller(f)
					Mr. Bossing(w)
					Mr. Bossing(s)
	2	III	MWF	210Bu	Mr. McConnell(f)
					Mr. Morse(w)
				106Pt	Mr. Boardman(s)
	3	VII	MWF	210Bu	Mr. Wrenn(f)
					Mr. Logan(w)
					Ar(s)
Ed.51Aw†	Introduction to Secondary School Teaching (See 51A, B, C)				
	Sec. 1	I	MWF	115Psy	Mr. Van Wagenen
	2	III	TThS	210Bu	Ar
Ed.51As†	Introduction to Secondary School Teaching (See 51A, B, C)				
	Sec. 1	I	MWF	115Psy	Mr. Miller
	2	III	TThS	210Bu	Mr. Van Wagenen
Ed.51Bf†‡	Introduction to Secondary School Teaching (See 51A, B, C) (Prereq. Ed. 51A)				
		II	TThS	210Bu	Mr. Morse
Ed.51Bs†‡	Introduction to Secondary School Teaching (See 51A, B, C) (Prereq. Ed. 51A)				
		II	MWF	210Bu	Mr. Morse
Ed.51Cf†	Introduction to Secondary School Teaching (See 51A,B,C) (Prereq. Ed. 51A,B)				
		II	MWF	210Bu	Mr. Boardman
Ed.51Cw†	Introduction to Secondary School Teaching (See 51A,B,C) (Prereq. Ed. 51A,B)				
		II	MWF	210Bu	Mr. Boardman
Ed.54-55-56	Fundamental Art Experiences (See Art Ed. 54-55-56)				
Ed.61Af-61Bw-61Cs†‡	Introduction to Elementary School Teaching (9 cred.; prereq. 6 cred. in psy. and a C average)				
		VII-VIII	TTh	100Pt	Mr. Van Wagenen(f)
				Dem. schools	Mr. Staudenmaier(w,s)

† The entire course including the final examination covering all units must be successfully completed before credit is given for any quarter. Students who have already received credit for courses formerly numbered Ed.Psy. 55, Ed.Ad. 65, and Ed.T. 15, or Ed. 51-52-53 are not eligible for this course. Graduates of teachers colleges should consult their advisers before registering for any part of this course.

‡ A fee of $1 per credit is charged for Ed. 51B and Ed. 61A-61B-61C.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Wf,w,s	Professional Preparation for Teaching—This classification is designed for students already holding a baccalaureate degree who desire to complete their preparation for teaching and qualify for the state teacher's certificate. Such students should consult the adviser as to their eligibility and outline for approval a program covering at least three quarters' study. The entire program must be completed successfully before credit is allowed for any of the courses taken. (Minimum of 45 cred.; prereq. a B average and consent of Mr. Carlson, course adviser)	Ar	Ar	Ar	Mr. Carlson
Ed.71f,w,s	Brief Course in History of Education (5 cred.; jr., sr.; prereq. 6 cred. in psy.)	IV	MTWFS	210Bu	Miss Alexander
Ed.73s	Educational Sociology (3 cred.; jr., sr.; prereq. 6 cred. in psy.)	VII	MWF	106Pt	Ar
Ed.75	*Public Education in the U. S.* (3 cred.; jr., sr.; prereq. 6 cred. in psy.) *(Not offered)*				
Ed.76f	Introduction to the Philosophy of Education (3 cred.; jr., sr.; prereq. 6 cred. in psy.)	I	MWF	106Pt	Mr. Brameld
Ed.77w	Philosophic Foundations of Modern Education (3 cred.; jr., sr.; prereq. Ed. 76 or at least one course in general philosophy)	I	MWF	100Pt	Mr. Brameld
Ed.78s	Education and Problems of American Democracy (3 cred.; jr., sr.; prereq. Ed. 76 or 9 cred. in ed.)	I	MWF	100Pt	Mr. Brameld
Ed.101f	Historical Foundations of Modern Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.)	VI	MWF	210Bu	Miss Alexander
Ed.102w	History of Modern Secondary and Higher Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.)	VI	MWF	210Bu	Miss Alexander
Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had Ed. 71)	VI	MWF	210Bu	Miss Alexander
Ed.104w	Adult Education (2 cred.; jr., sr., grad.)	III-IV	S	206UHS	Ar
Ed.105s	Visual Aids in Teaching (2 cred.; jr., sr., grad.)	III-IV	S	106Pt	Ar
Ed.107f-108w†	Radio in Education (4 cred.; jr., sr.; prereq. 9 cred. in ed.)	I-II	S	115UHS	Mr. Tyler
Ed.107s	Radio in Education (3 cred.) (See 107-108)	III	MWF	100Pt	Mr. Tyler
Ed.129-130	*Educational Classics* (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) *(Not offered)*				
Ed.131	*Comparative School Systems* (3 cred.; prereq. 9 cred. in ed.) *(Not offered)*				
Ed.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	209Bu	Miss Edwards, Miss Wright
Ed.167s	Junior High School (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51)	IX-X	M	100Pt	Mr. Bossing
Ed.176f,s	Methods of Propaganda Analysis for Teachers (2 cred.; sr., grad.; prereq. 9 cred. in ed.)	I-II	S	206UHS	Mr. Brameld
Ed.179f	Current Political Doctrines and Education (2 cred.; sr., grad.; prereq. 9 cred. in ed. and 6 cred. in pol. sci.)	IX-X	W	206UHS	Mr. Brameld
Ed.180w	Education and Social Action (2 cred.; sr., grad.; prereq. Ed. 179 or consent of instructor)	IX-X	W	206UHS	Mr. Brameld

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

No.	Title	Hour	Day	Bldg.	Instructor
Ed.181s	Education and Social Ideals (2 cred.; sr., grad.; prereq. Ed. 179 and 180 or consent of instructor)	IX-X	W	206UHS	Mr. Brameld

For Graduate Students Only

Ed.205	*Problems in Adult Education* (2 cred. a qtr.) *(Not offered)*				
Ed.207f,w,s	Problems in Radio Education (Cred. ar.)	Ar	Ar	Ar	Mr. Tyler
Ed.208w*	Methods in Educational Research (2 cred.)	IX-X	M	114UHS	Mr. Johnson
Ed.224f-225w-226s	Seminar in Elementary School Problems	IX	Th	209Bu	Mr. Brueckner, Mr. Bond
Ed.228f-229w-230s*	Problems of College Education (6 cred.)	Ar	Ar	Ar	Mr. McConnell and others
Ed.231f,w,s*	Problems in Comparative Education (2 to 6 cred.)	Ar	Ar	Ar	
Ed.233f,w,s*	Problems in Guidance and Personnel Work (Cred. ar.)	Ar(f,w)	Ar	Ar	Mr. Wrenn,
		IX-X(s)	W	113Psy	Miss Edwards
Ed.241f-242w-243s*	Problems in the History of Education (2 cred. a qtr.; prereq. permission of instructor)	Ar	Ar	Ar	Mr. Wesley
Ed.250f	Higher Education in the United States (3 cred.; prereq. 15 hrs. in ed.)	I-II 1 hr. ar.	S	114UHS	Mr. McConnell
Ed.251w	Curriculum and Instruction in Higher Education (3 cred.; prereq. same as for 250)	III-IV 1 hr. ar.	S	114UHS	Mr. McConnell
Ed.252s	Student Personnel Work in College and University (3 cred.; prereq. same as for 250)	VII	MWF	100Pt	Mr. Wrenn
Ed.253w	Administration in Higher Education (3 cred.; prereq. same as for 250)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.254s	Measurement and Evaluation in Higher Education (3 cred.; grad.; prereq. same as for 250)	I-II 1 hr. ar.	S	100Pt	Mr. Johnson
Ed.276f,w,s	Problems in Educational Philosophy (Cred. ar. Consult instructor)	Ar	Ar	Ar	Mr. Brameld
Ed.285f	Professional Education of Teachers (2 cred.; prereq. 15 hrs. in ed.)	III-IV	S	205bUHS	Mr. Peik
Ed.286f,w,s*	Problems in Teacher Training (2 cred. a qtr.; prereq. 285 or permission of instructor)	Ar	Ar	Ar	Mr. Peik
Ed.287s	Instruction and Administration in Teacher Training Institutions (2 cred.; prereq. 15 cred. in ed.)	I-II	S	205bUHS	Mr. Peik
Ed.288	*Special Problems in Educational Sociology* (2 cred.; prereq. 15 cred. in ed. including Ed. 73) *(Not offered)*				

AGRICULTURAL EDUCATION

Major adviser.—Professor Field.

No.	Title	Hour	Day	Bldg.	Instructor
Agr.Ed.51	*Educational Psychology* (3 cred.; jr., sr.; no prereq.) *(Not offered)* (See Ed. 51A)				
Agr.Ed.52f,s	Vocational Education (3 cred.; jr., sr.; no prereq.)	Ar	Ar	301Hr	Mr. Ekstrom

* This course may be taken for independent work under Plan B for the Master's degree.

No.	Title	Hour	Day	Bldg.	Instructor
Agr.Ed.54f,w	Rural Education and Community Leadership (3 cred.; jr., sr.; prereq. 51)	IV and 1 hr. ar.	TS	301Hr	Mr. Field
Agr.Ed.56w	Rural Youth Leadership (3 cred.; jr., sr.; no prereq.)	II	MWF	301Hr	Mr. Harden
Agr.Ed.80s	Extension Work (3 cred.; jr., sr.; prereq. 6 cred. in farm management, 6 cred. in farm crops, 15 cred. in animal industry, 3 cred. in agr. ed.)	VI	MWF	301Hr	Mr. Field
Agr.Ed.81f	Teaching Agriculture (5 cred.; jr., sr.; prereq. 51)	III	MTWThF	301Hr	Mr. Field, Mr. Ekstrom
Agr.Ed.82w	Teaching Agriculture (Same as 81f)	III	MTWThF	301Hr	Mr. Field, Mr. Ekstrom
Agr.Ed.83s	Teaching Agriculture (Same as 81f)	III	MTWThF	301Hr	Mr. Field, Mr. Ekstrom
Agr.Ed.91f,w,s‡§	Supervised Teaching Experience (3 cred.; sr.; prereq. 82 and a C+ average in the major)	Ar	Ar	Ar	Mr. Field, Mr. Raine
Agr.Ed.135f	The Curriculum in Vocational Agriculture (3 cred.; sr.; prereq. 10 cred. in ed.)	Ar	Ar	Ar	Mr. Field, Mr. Raine
Agr.Ed.141w	Supervised Practice in Vocational Agriculture (3 cred.; sr.; prereq. 10 cred. in ed.)	Ar	Ar	Ar	Mr. Ekstrom, Mr. Raine
Agr.Ed.161s	Vocational Education in Agriculture (3 cred.; jr., sr.; prereq. 15 cred. in ed.)	Ar	Ar	Ar	Ar
Agr.Ed.171f,w,s	Problems in Procedure (3 cred.; sr.; prereq. 82, 91, or equiv. teaching experience)	Ar	Ar	Ar	Mr. Field
Agr.Ed.291f-292w-293s	Seminar in Agricultural Education (6 cred.; sr. grad.; prereq. 15 cred. in agr. ed.)	Ar	Ar	Ar	Mr. Field, Mr. Ekstrom

ART EDUCATION

Major advisers.—Professors Raymond, Faulkner; Associate Professor Hilpert.

Group A—Design

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.1f-2w-3s¶	Fundamental Experiences in Design (9 cred.; all; prereq. high school art or 14-15-16)				
	Sec. 1	III-IV	MWF	207aJ	Mr. Torbert
	2	II-III	TThS	207aJ	Mr. Torbert
ArtEd.14f-15w-16s	Introduction to Art (9 cred.; required of all entering Art Ed. as majors or minors; no prereq.)	I	MWF	207bJ	Mr. Hilpert
ArtEd.14Af-15Aw-16As	Introduction to Art Laboratory (6 cred.; req. in addition to 14-15-16 of those without high school art; no prereq.)	I-II	TTh	207bJ	Mr. Hilpert

‡ 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 the subject in which student teaching is done, are prerequisite to this course.

¶ Each term gives some craft experience for which 1 credit may be allowed toward requirement in Group B.

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.17f-18w-19s	Art for Elementary Teachers (9 cred.; for non-art majors preparing to teach in primary and elementary grades; no prereq.)				
	Lect.	IV	T	207bJ	Mr. Ziegfeld,
	Sec. 1 (f,w,s)	I-II	TTh		(f,w,s)
	2 (f,w)	VI-VII	MW		Miss Ross(s)
ArtEd.20f-21w-22s§	Fundamental Experiences in Design—Continued (9 cred.; prereq. Art Ed. 1-2-3)	II-III	MWF	207bJ	Miss Berglund

Senior College and Graduate Courses

ArtEd.50f	Commercial Design (3 cred.; prereq. 1-2-3 or evidence of fitness)	I-IV	S	207bJ	Mr. Hilpert
ArtEd.51w	Industrial Design (3 cred.; prereq. 1-2-3 or evidence of fitness)	I-IV	S	207J	Mr. Hilpert
ArtEd.52Af-52Bw	Design for Home and Furnishing (3 cred.; jr., sr.)	VI-VII	MWF	207J	Mr. Faulkner
ArtEd.54-55-56	*Fundamental Experiences in Art* (6 cred.; for nonmajors; prereq. 14-15-16 or 17-18-19) *(Not offered)*				
ArtEd.70f-71w-72s§	Fundamental Experiences in Design—Continued—Color Emphasis (9 cred.; same as 20-21-22 but held to Senior College level; prereq. 1-2-3 or equiv., or evidence of fitness)	II-III	MWF	207bJ	Miss Berglund
ArtEd.152s	Landscape Design (3 cred.; sr., grad.)	VI-VII	MWF	207bJ	Mr. Faulkner
ArtEd.153-154w-155E	Art in Society (9 cred.; sr., grad.)				
	153—The Home—Not offered				
	154—Costume				
	155E—Painting, Sculpture, Architecture, Ceramics—Not offered	4:00-5:00	MWF	207bJ	Miss Raymond

Group B—Handcrafts

At the Senior College level each art major should choose one or two materials with which he should acquire expert skill and with whose possibilities in terms of both handcraft and productive industry he should be familiar. Unless otherwise stated courses in handcraft carry three credits.

Junior College Courses

Contacts with materials and hand-processes, primarily for nonmajors. Lectures and demonstrations in handcraft for public school, social work, summer camps, etc.

ArtEd.31f,w	Orientation in Handcraft Processes (3 cred.; no prereq; not open to those taking 17-18-19)	I-II	TThS	10J	Miss Ross

Senior College Courses

ArtEd.73f,w‡	Ceramic Materials and Processes				
	Lect. and demon. Sec. 1	VII	M	10J	Miss Ross
	2	VI	T	10J	Miss Ross
	Lab.	V-VIII	MTThF	10J	Miss Ross
		(VI-VII)	Ar		

‡ A fee of $1.50 per quarter 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.

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.74,75w‡	Ceramic Processes				
	Lect. and demon. Sec. 1	VII	F	10J	Miss Ross
	2	VI	Th		
	Lab.	V-VIII	MTThF	10J	Miss Ross
		(VI-VII)	Ar	10J	Miss Ross and assistant
ArtEd.75Bs‡	Bookbinding Process (Schedule same as for ArtEd. 73)				
ArtEd.75Ms‡	Metal Work (Schedule same as for Art Ed. 74, 75)				
ArtEd.76f‡	Textile Materials and Processes				
	Lect. and demon.	VI	MF	11J	Miss Berglund
	Lab.	VII-VIII	MF	11J	Miss Berglund
ArtEd.77w‡	Textile Processes, Advanced				
	Lect.	VI	MF	11J	Miss Berglund
	Lab.	VII-VIII	MWF		
ArtEd.78s‡	Textile Processes				
	Sec. 1 Printing processes	VI-VII-VIII	MF	11J	Miss Berglund
	2 Weaving processes ar. if demanded				

Group C—Representation

ArtEd.4f,w,s-6f,w,s-8f,w,s	Drawing from Still Life and Pose (2 cred. a qtr.; no prereq.)				
	Sec. 1	V-VI	MF	203J	Miss Lutz
	2	VII-VIII	MF	203aJ	Mr. Torbert
	3 (for nonmajors)	VI-VII	MW	203J	Miss Lutz
ArtEd.10-11-12	*Experiences with Rhythm and Color (Not offered as separate course in 1939-40)*				
ArtEd.23w,s	Composition Clinic (2 cred.)				
		III-IV	S	207aJ	Mr. Torbert
ArtEd.24f,w,s-26f,w,s-28f,w,s	Drawing and Painting from Still Life and Pose (Continuation of 4-6-8) (2 cred. each)				
	Sec. 1	I-II	TTh	203J	Miss Lutz
	2	II-III	TTh	203J	Miss Lutz
	3	VI-VII	TTh	203J	Miss Lutz
ArtEd.29f,w,s-30f,w,s	Rhythmic Sketch—Simple recordings on blackboard and paper, helpful in public schools (1 cred. a qtr.; no prereq.)				
		I-II	S	203aJ	Miss Raymond
ArtEd.61,62,63f,w,s	Painting (2 cred. each)				
	Sec. 1	II-III	TTh		Miss Lutz
	2	VI-VII	TTh		Miss Lutz
	3	I-IV	S		Miss Lutz
ArtEd.66,67,68f,w,s	Painting (Continuation of 61,62.63)				
		I-IV	S	203J	Miss Lutz
ArtEd.124E-125E-126Ef,w,s	Advanced Painting (2 to 6 cred.)				
		Ar	Ar	Ar	Ar

Group D—Appreciation

Tours to stores and galleries are arranged in connection with all courses.

For History of Art see offerings in Fine Arts, Architecture, and Home Economics.

ArtEd.57-58 *Art and Leisure*—Participation in cultural advantages of Twin City galleries and auditoriums (1 cred. each) *(Not offered in 1939-40. See orientation 6-7-8)*

ArtEd.153-154w-155E Art in Society (See Group A)

‡ A fee of $1.50 per quarter is charged for this course.

Group E—Professional Courses

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.84s	Teaching of Art in the Elementary Grades (3 cred.; prereq. Ed. 61A-B-C or equiv.)				
		VIII	MWF	Ar	Mr. Ziegfeld
ArtEd.86f-87w-88s‡§	Special Methods and Directed Teaching in Art (12 cred.; prereq. senior standing)				
		III			Miss Raymond
		VI-VII	TTh	Pub.Sch.	Mr. Ziegfeld
		1 hr. ar.			
ArtEd.183Es	Philosophy of Art Education (3 cred.; sr., grad.)				
		4:00-5:00	MWF	207bJ	Miss Raymond
ArtEd.185Ew	Types of Art Instruction II (3 cred.; sr., grad.)				
		I-II	S	207aJ	Mr. Ziegfeld
		IX	W		
ArtEd.189f	Application of Esthetic Theory to Public Education (3 cred.; sr., grad.)				
		4:00-5:00	MWF	207bJ	Miss Raymond
ArtEd.284Ew	Reading and Research in Art Education (3 cred.; grad.)				
		4:00-500	F	207bJ	Mr. Faulkner
		I-II	S	207bJ	
ArtEd.290Ef,291Ew, 292Es	Special Problems in Art Education				
		Ar	Ar	Ar	Miss Raymond, Mr. Hilpert, and others
ArtEd.295f,w,s*	Special Problems in Art Education				
		Ar	Ar	Ar	Mr. Faulkner

CURRICULUM AND INSTRUCTION

Major advisers.—Professors Bossing and Brueckner; Assistant Professor Bond.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.63f	Children's Literature (2 cred.; jr., sr.)				
		IX-X	M	106Pt	Miss Smith
Ed.C.I.110w	Education of Handicapped Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)				
		II	T	100Pt	Mr. Bond
		III	TTh		
Ed.C.I.113f	High School Curriculum (2 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51)				
		IX-X	T	210Bu	Mr. Bossing
Ed.C.I.118	*Problems in Junior High School English (Not offered)*				
Ed.C.I.119f	Elementary School Curriculum (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.)				
		I	MWF	100Pt	Mr. Bond
Ed.C.I.119T-120T	*Elementary School Curriculum* (4 cred.; sr., grad.) *(Not offered)*				
Ed.C.I.121w	Educational Advising of Women and Girls (3 cred.; sr., grad.; prereq. 15 cred. in ed.)				
		VIII	MWF	112Bu	Miss Blitz
Ed.C.I.122s	Literature for Adolescents (2 cred.; jr., sr., grad.; prereq. Ed. 51C or junior-senior high school 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	209Bu	Miss Edwards, Miss Wright
Ed.C.I.143f‡	Teaching of Reading in the Elementary School (2 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A)				
		IX-X	W	100Pt	Mr. Bond

* 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.
§ Passing the qualifying examination is prerequisite to this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. same as for 143)	IX-X	M	100Pt	Mr. Bond
Ed.C.I.145s‡	Remedial Reading (2 cred.; prereq. Ed.C.I. 143 or 144 or 159)	IX-X	M	221Bu	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. 54B)	III-IV	S	204bUHS	Miss Smith
Ed.C.I.148	*The Teaching of Primary Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) (Not open to students who have had Ed.T. 54B) *(Not offered)*				
Ed.C.I.149s	The Teaching of Intermediate Grade Arithmetic (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) (Not open to students who have had Ed.T. 54B)	I-II	S	210Bu	Mr. Brueckner
Ed.C.I.150f‡	Supervision and Improvement of Instruction (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.)	II	MWF	100Pt	Mr. Brueckner
Ed.C.I.150Tw‡	Supervision and Improvement of Instruction (Same as above)	I-II 1 hr. ar.	S	204bUHS	Mr. Brueckner
Ed.C.I.151w‡	Diagnosis and Remedial Instruction (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	II	MWF	100Pt	Mr. Brueckner
Ed.C.I.151Tf‡	Diagnosis and Remedial Instruction (Same as above)	I-II	S	204bUHS	Mr. Brueckner
Ed.C.I.152	*The Adjustment of Schools to Individual Differences* (2 cred.; sr., grad.; prereq. 15 hrs. in ed.) *(Not offered)*				
Ed.C.I.153	*Supervision and Teaching of English in the Elementary Schools* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) *(Not offered)*				
Ed.C.I.155	*Supervision and Teaching of Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61C or equiv.) (See Ed.C.I. 148, 149) *(Not offered)*				
Ed.C.I.156s‡	Practice Supervision—Group Problems and Field Work (3 cred.; sr., grad.; prereq. 15 hrs. in ed. and permission of instructor)	I-IV	TTh	100Pt Dem schools, Twin City schools	Mr. Brueckner, Mr. Bond
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.159	*The Supervision and Teaching of Reading* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) *(Not offered)*				
Ed.C.I.160s‡	Supervision of Elementary Subjects (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	IX-X 1 hr. ar	T	204bUHS	Mr. Brueckner, Mr. Bond, Miss Smith, Mr. Wesley
Ed.C.I.162f	Significance of Progressive Education (2 cred. per qtr.; sr., grad.)	IX-X	T	204bUHS	Mr. Brueckner
Ed.C.I.168	*Current Developments in the Social Studies* (2 cred.; grad. only) *(Offered in alternate years. Not offered in 1939-40;* See Ed.C.I. 254)				
Ed.C.I.169w	Extra-curricular Activities (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	III	TTh	106Pt	Mr. Carlson
Ed.C.I.170f,w	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, secondary, and higher education levels (3 cred.; sr., grad.; prereq. 15 hrs. in ed.) (Formerly Ed.C.I. 172)	I-II 1 hr. ar.	S	204aUHS	Mr. Bossing, Mr. Bond, and others

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

No.	Title	Hour	Day	Bldg.	Instructor
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)	Ar	Ar	Ar	Mr. Bossing, Mr. Bond
Ed.C.I.174f-175w-176s†‡§	Clinical Methods and Practice in Speech Pathology (9 cred.; sr., grad.; prereq. Sp. 1, 2, 3, 61, 67, 162; Psy. 4-5; Zool. 83 or Psy. 52; Ed.Psy. 60; Human Physiol. 2; Human Anat. 3; and permission of instructor)	III other hrs. ar.	TTh	406F	Mr. Bryngelson, Mr. Brown
Ed.C.I.181s‡	Foundations of Elementary School Methods (3 cred.; sr., grad.; prereq. 9 hrs. in ed.)	II	MWF	100Pt	Mr. Brueckner
Ed.C.I.181T-182T‡	*Foundations of Elementary School Methods* (See 181 above) *(Not offered)*				
Ed.C.I.184f	Supervision of Student Teaching (2 cred.; sr., grad.)	I-II	S	117UHS	Mr. Carlson
Ed.C.I.188‡	*Advanced Course in Methods of Teaching Modern Languages* (2 cred.; sr., grad.; prereq. Ed.T. 72A-B-C, or experience in teaching the modern languages) *(Not offered)*				
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. Drake
Ed.C.I.198	*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) *(Not offered)*				

For Graduate Students Only

Ed.C.I.201f-202w-203s*†	Problems in Teaching the Social Studies (2 cred. a qtr.; grad.; prereq. consent of instructor)	4:00	T		Mr. Krey, Mr. Wesley
Ed.C.I.222f-223w-224s	Seminar in the Technique of High School Instruction (No cred.; grad.; 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.254f	Supervision of the Social Studies (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.261f,w,s*	Special Problems in School Supervision (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	Ar	Ar	220Bu	Mr. Brueckner
Ed.C.I.263f*	Research in Arithmetic Instruction (2 cred.; prereq. Ed.C.I. 156 or 148 or 149 or equiv.)	III-IV	S	204bUHS	Mr. Brueckner
Ed.C.I.264w*	Research in Educational Diagnosis (2 cred.; prereq. Ed.C.I. 151 or equiv.)	IX-X	T	204bUHS	Mr. Brueckner, Mr. Bond
*Ed.C.I.265**	*Recent Literature in Supervision* (2 cred.) *(Not offered)*				

* 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.

§ Passing the qualifying examination is prerequisite to this course.

No.	Title	Hour	Day	Bldg.	Instructor
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	202UHS	Mr. Boardman
Ed.C.I.271f,w,s*	Problems in Curriculum Construction (2 or 3 cred. a qtr. with a maximum of 6; prereq. completion or current enrolment in one of the following: Ed.C.I. 113, 119, 170 or equiv.)	Ar	Ar	Ar	Mr. Bossing, Mr. Bond
Ed.C.I.273f,w,s	Problems in Reading (2 to 6 cred.; prereq. previous training in reading such as Ed.C.I. 159 or equiv.)	Ar	Ar	Ar	Mr. Bond
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 (2 cred. a qtr.; grad.)	Ar	Ar	206Bu	Miss Smith

EDUCATIONAL ADMINISTRATION

Major advisers.—Professors Neale, Boardman, Bossing.

Note.—This section includes courses formerly listed under Administration and Supervision. For other courses see General Courses, and Curriculum and Instruction.

No.	Title	Hour	Day	Bldg.	Instructor
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
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.180f,w,s‡	Practice in High School Administration (2 cred. a qtr.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51C)	Ar	Ar	Ar	Mr. Boardman

For Graduate Students Only

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.218f-219w-220s	Seminar in Secondary School Problems	IX-X	Th	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.226s	School Plant Planning and Management (3 cred.; sr., grad.; prereq. 124, 125)	IX-X 1 hr. ar.	M	224Bu	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
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	202UHS	Mr. Boardman
Ed.Ad.270f,w,s*	Special Problems in Secondary Education (2 cred. a qtr.)	Ar	Ar	218Bu	Mr. Boardman, Mr. Bossing

EDUCATIONAL PSYCHOLOGY

Major advisers.—Professors Miller, Johnson, McConnell, Wrenn; Associate Professors Cook, Van Wagenen.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.60f	Introduction to Statistical Methods (2 cred.; jr., sr.; prereq. 6 cred. in psy.)	I-II	S	106Pt	Miss Wilder
Ed.Psy.60w,s	Introduction to Statistical Methods (3 cred.; see 60f)	II	MWF	106Pt	Miss Wilder
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.116w-117s	Statistical Methods in Education (4 cred.; sr., grad.)	IX-X	T	115Psy	Mr. Van Wagenen
Ed.Psy.120f	Basic Principles of Measurement (3 cred.; sr., grad.; prereq. Ed.Psy. 60 or equiv.)	IV	MWF	100Pt	Mr. Cook
Ed.Psy.120w	Basic Principles of Measurement (3 cred. See 120f)	IX-X 1 hr. ar.	M	205bUHS	Mr. Cook
Ed.Psy.138-139†	*Experimental Educational Psychology* (4 cred.; sr., grad.; prereq. 51A or equiv.) *(Not offered)*				
Ed.Psy.140w	Tests and Measurement in Elementary and Secondary Education (3 cred.; sr., grad.; prereq. 120 or equiv.)	IV	MWF	Ar	Mr. Cook
Ed.Psy.141w	Group Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	VIII	MWF	115Psy	Mr. Miller
Ed.Psy.142s	Individual Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	4:30-5:45	TTh	115Psy	Mr. Cook
Ed.Psy.143s	Individual Mental Testing Laboratory (2 cred.; prereq. Ed.Psy. 142)	4 hr. ar.	Ar	115Psy	Mr. Cook
Ed.Psy.146w-147s†	Child Guidance (4 cred.; jr., sr., grad.; prereq. 15 cred. in psy. and ed.)	I-II	S	106Pt	Mr. Brown
Ed.Psy.149f-150w†-151s	Psycho-educational Clinic (2 to 6 cred.; sr., grad.; permission of instructor; prereq. 120, 140 and 141 or 142)	Ar	Ar	357Psy	Mr. Cook
Ed.Psy.157	*Psychology of Child Development* (2 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) *(Not offered)* (See Child Welfare 130-131)				
Ed.Psy.158s	Psychology of Adolescence (3 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	III	MWF	210Bu	Miss Edwards

* 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.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.159f,w	Personality Adjustments in Education (3 cred.; sr., grad.; prereq. 9 hrs. in Ed. or Ed. 51A and 116)	VII	MWF	115Psy	Mr. Wrenn
Ed.Psy.180	*Esthetics in Education* (2 cred.; sr., grad.; consent of instructor) *(Not offered)*				
Ed.Psy.183w	Psychology of Gifted Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	II	TTh	115Psy	Ar
Ed.Psy.184s	Education of the Slow Learning Child (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	IX-X	W	Ar	Mr. Cook
Ed.Psy.189	*The Human Organism* (3 cred.; sr., grad.; prereq. permission of instructor) *(Not offered)*				

For Graduate Students Only

Ed.Psy.201f-202w-203s	Seminar in Educational Psychology	Ar	Ar	301Psy	Mr. Miller, Mr. Johnson, Mr. McConnell, Mr. Wrenn, Mr. Bond, Mr. Cook, Miss Edwards, Mr. Van Wagenen
Ed.Psy.216f-217w-218s	Statistical Methods in Education (3 cred. a qtr.; grad.)	II	MWF	109Psy	Mr. Johnson
Ed.Psy225w*	Diagnosis and Counseling in Guidance (3 cred.; prereq. Ed. 133 and Ed.Psy. 120 or equiv.)	IX	MWF	113APsy	Mr. Wrenn
Ed.Psy.240f,w,s*	Problems in Measurement (2 cred. a qtr.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.253f-254w-255s*	Research Problems (Ar.; prereq. consult instructor) (See also Ed. 233 and Ed.Psy. 240)	Ar	Ar	Ar	Mr. Miller, Mr. McConnell, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.281f,w,s	Practice in Personnel Work (2 cred. a qtr.; prereq. satisfactory preparation in psy. and ed. and approval of adviser)	Ar	Ar	Ar	Miss Edwards, Mr. Wrenn, Mr. Darley
Ed.Psy.290f	Original Nature of Man (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.291w	Individual Differences (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.292s*	Recent Literature in Educational Psychology (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.293w-294s*	Psychology of Learning (3 cred. a qtr.; prereq. 12 cred. in psy. and ed. psy.)	IV	MWF	100Pt	Mr. McConnell

* This course may be taken for independent study under Plan B for the Master's degree.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.293Tw	Psychology of Learning (3 cred. See 293-294. For teachers and administrators)	III-IV 1 hr. ar.	S	100Pt	Mr. McConnell and others
Ed.Psy.297-298-299	*Problems in Subnormality* (6 cred.; jr., sr., grad.) *(Not offered)*				

HOME ECONOMICS EDUCATION

Major advisers.—Professors Wylle B. McNeal, Clara M. Brown; Assistant Professor Ella J. Rose.

Note.—Courses in Home Economics are open to all students in the College of Education who have satisfied the prerequisites or by permission of the chief of the division. For program of courses see page 139.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.90f,s	Child Training (3 cred.; jr., sr.; prereq. Psy. 1-2)	IV	MWF	213HE	Mrs. Foster
H.E.Ed.90w	Child Training (Same as 90f,s)	IV 1 hr ar.	MW	106Pt	Mrs. Foster
H.E.Ed.91f,w‡§	Observation, Materials, Teaching in Home Economics (5 cred.; jr., sr.; prereq. H.E. 4, 34 [or 170], 41, 50, 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 93)	VI III-IV	MTWThF Th	213HE Ar	Miss Rose
H.E.Ed.92w,s	Teaching Problems in Home Economics (2 cred.; sr.; prereq. H.E.Ed. 91, 93, parallel H.E.Ed. 94 and H.E.Ed. 192)	VII	TTh	213HE	Miss Rose
H.E.Ed.93f,w‡§¶	Supervised Teaching in Home Economics (3 cred.; jr., sr.; prereq. H.E. 4, 34 or 170], 41, 50, 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 91)	Ar 3 consecutive hours daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.94w,s‡¶	Supervised Teaching in Home Economics (3 cred.; sr.; prereq. H.E.Ed. 91, 93, parallel H.E.Ed. 92 and 192)	Ar 3 consecutive hours daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.192f	Educational Measurement in Home Economics (3 cred.; grad.; prereq. Ed. 51A or equiv.)	Ar	Ar	Ar	Miss Brown
H.E.Ed.192w,s	Educational Measurement in Home Economics (2 cred.; sr., grad.; prereq. Ed. 51A or equiv., parallel H.E.Ed. 92 and 94)	VIII	TTh	213HE	Miss Clara Brown, Miss 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.194af	Adult Education Problems (3 cred.; sr., grad.; prereq. H.E.Ed. 91, 93 or equiv.)	Ar	Ar	Ar	
H.E.Ed.194bs	Adult Education Problems (3 cred.; sr.; prereq. same as for 194a)	Ar	Ar	Ar	

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

§ Passing the qualifying examination is prerequisite to registration in this course.

¶ A grade of at least C is required in the following courses; H.E. 1, 3, 4, 20, 21, 22, 31, 34 (or 170), 40, 41, 55.

No.	Title	Hour	Day	Bldg.	Instructor
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. Goldstein

For Graduate Students Only

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.292w,s*	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 McNeal, Miss Clara Brown, Miss Rose
H.E.Ed.294f,w,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 adviser.—Professor Homer J. Smith.

No.	Title	Hour	Day	Bldg.	Instructor
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. Not a part of the four-year curriculum) (Limited to 24)	I-IV	S	6Pt	
Ind.30f	Graphic Presentation (2 cred.; no prereq.)	IX-X	F	202EdH	
Ind.40f	Analysis (2 cred.; no prereq.)	IX-X	Th	202EdH	
Ind.42w	Course Organization (2 cred.; prereq. Ind. 40)	IX-X	Th	202EdH	
Ind.44s	Equipment and Management (2 cred.; prereq. Ind. 40, 42)	IX-X	Th	202EdH	
Ind.50Af-50Bw-50Cs‡§	Directed Teaching (6 cred.; sr.; prereq. Ind. 70 or 75, and 80)	Ar	Ar	6Pt	Mr. Micheels
Ind.60f	Philosophy of Vocational Education (2 cred.; no prereq.)	IX-X	M	202EdH	
Ind.61w	Practices in Vocational Education (2 cred.; prereq. Ind. 60)	IX-X	M	202EdH	
Ind.65	*Non-vocational Subjects* (Not a part of the four-year curriculum) *(Not offered)*				
Ind.66w	Related Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	
Ind.70s‡	Methods in Shop Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	

* 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.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done, are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.75s‡	Methods in Drawing (2 cred.; prereq. 10 cred. in drawing or consent of instructor. Not a course in drawing)	IX-X	T	202EdH	
Ind.80f	General Industrial Training (2 cred.; no prereq.)	IX-X	T	202EdH	
Ind.81w	The General Shop (2 cred.; jr., sr.; prereq. Ind. 80. Not a shop course)	IX-X	T	202EdH	
Ind.101f	Tests in Industrial Subjects (2 cred.; prereq. Ed. 51A)	I-II	S	205aUHS	
Ind.103w	Instructional Aids (2 cred.; sr., grad.; prereq. Ind. 40, 42)	I-II	S	205aUHS	
Ind.105w	Industrial Education (3 cred.; jr., sr., grad.) (Not a part of the four-year curriculum. For certain students in the specialty and for students of administration and supervision, commercial education, etc.)	VIII	MWF	202EdH	
Ind.107s	Co-ordination (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61 or 105 or consent of instructor)	IX-X	M	202EdH	
Ind.108s	Apprenticeship (2 cred.; jr., sr., grad.; prereq. same as for 107)	III-IV	S	202EdH	
Ind.110s	Guidance in the Schools (3 cred.; jr., sr., grad.; prereq. Ed. 51A. See Ed. 133)	VIII	MWF	202EdH	
Ind.115s	Supervision of Industrial Education (2 cred.; sr., grad.; prereq. Ind. 60, 80, Ed.Ad. 124 or consent of instructor. Not a part of the four-year curriculum. For advanced students in the specialty and for students of administration and supervision)	I-II	S	205aUHS	
Ind.170f	Day Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61)	III-IV	S	205aUHS	
Ind.171w	Evening Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 170)	III-IV	S	205aUHS	
Ind.172s	Part-time Education (2 cred.; jr., sr., grad.; prereq. Ind. 170, 171)	IX-X	Th	202EdH	

For Graduate Students Only

Ind.200f,w,s*	Research Problems (3 to 9 cred.; prereq. consent of instructor)	IX	M	Ar	
Ind.250f-251w-252s	Problems in Vocational Education (6 cred.; prereq. consent of instructor. Plan for full year)	IX-X	W	202EdH	

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. All shop and drawing courses should be taken under special advice and may be either extensive or intensive in resultant preparation for teaching. Degree candidates, especially those transferring from other institutions, should bear in mind the maximum of forty-five quarter credits, of shopwork and drawing combined, which is enforced in this department. Twenty credits of shopwork and ten credits of drawing are required. Credits in excess of forty-five will be recorded but will not be counted toward degree requirements. Certain off-campus courses and services will be available. Those interested should consult with members of the Industrial Education staff.

METHODS AND DIRECTED TEACHING

Major adviser.—Assistant Professor Carlson.

Honor point average.—A C+ average (1.5 honor points) per credit in the major or in the subject in which student teaching is done, is required for registration in all directed teaching courses.

* 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.

Conference for Student Teachers.—The director of Student Teaching will arrange for a series of conferences which are a part of the required work in directed teaching. The hour at which these conferences are held will be announced in the fall.

Statement of fees.—For all courses in special methods, directed teaching, and special methods and directed teaching combined, a fee of $1 per credit is charged. Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done is prerequisite to all special methods and student teaching courses. For Clinical Methods and Directed Teaching in Speech Pathology see Ed.C.I. 174-175-176.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.50w,s‡	Special Methods and Directed Teaching in Health Education for Public Health Nurses (9 cred.; sr., grad.; prereq., permission of instructor)	VII-VIII and 3 hr. ar	TTh	Ar	Miss Palmer
Ed.T.51Aw‡§	Special Methods of Teaching in Schools of Nursing (3 cred.; sr., grad.; prereq. Ed. 51A,B)	III	MWF	Ar	Miss Petry
Ed.T.51Bs‡§	Special Methods of Teaching in the School and Teaching in Schools of Nursing (5 cred.; sr., grad.; prereq. Ed.T. 51A; prereq. or parallel Nu. 71 and Nu. 69)	III and 2 hrs. ar.	MWF	Ar	Miss Petry
Ed.T.52f,w,s‡§	Directed Teaching (5 cred.; sr.; prereq. Special Methods Course)	Ar	Ar	Ar	Mr. Carlson
Ed.T.53s‡§	Directed Teaching of Subnormal Children (5 cred.; sr.)	Ar	Ar	Ar	Mr. Carlson
Ed.T.54Af-54Bw-54Cs‡§	The Teaching of Elementary School Subjects (15 cred.; sr.; prereq. Ed. 61A-B-C or equiv.)	VI	MTWThF	100Pt	
		Fall—Reading			Mr. Bond
		Social Studies			Mr. Wesley
		Winter—English			Miss Smith
		Arithmetic			Mr. Brueckner
		Spring—Directed Teaching			Mr. Carlson
Ed.T.55f	Principles of Early Childhood Education (3 cred.; jr., sr.; prereq. C.W. 80 or simultaneously)	VIII	MWF	202Pt	Mrs. Foster
Ed.T.56s	Permanent Play Materials (2 cred.; jr., sr.; prereq. Psy. 1-2)	VII	MW	202Pt	Miss Mattson
Ed.T.57s‡	Plastic Materials (3 cred.; jr., sr.; prereq. C.W. 80)	VIII	MWF	202Pt	Miss Headley
Ed.T.58w	Rhythms, Games, and Music for the Young Child (2 cred.; jr., sr.; prereq. Ed.T. 55)	VIII-IX	F	202Pt	Miss Mattson
Ed.T.59w	Story Telling for Young Children (2 cred.; jr., sr.; prereq. Ed.T. 55)	V	TTh	202Pt	Miss Headley
Ed.T.60Af-60Bw-60Cs†‡§	Special Methods and Directed Teaching in Geography (9 cred.; sr.; prereq. 15 cred. in geography and Ed. 53)	VIII and 1 hr. ar.	MW	100Pt	Mr. Wesley
Ed.T.61s‡§	Teachers' Course in Norwegian (3 cred.; sr.; prereq. Scand. 4, 5 or 10-11, or 12)	Ar	Ar	122F	
Ed.T.62f,w‡§	Teachers' Course in Swedish (3 cred.; sr.; prereq. Scand. 10-11, 12 or 4, 5)	VII	MWF	122F	Mr. Stomberg

† 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 the subject in which student teaching is done, are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.64‡§	*Teaching of Geography and History in the Elementary School* (See Ed.T. 54A) *(Not offered)*				
Ed.T.65‡§	*Directed Teaching with Special Methods in Elementary Schools* (3 or 5 cred.; sr.; prereq. approval of instructor) *(Not offered)*				
Ed.T.66Af-66Bw-66Cs†‡§	Special Methods and Directed Teaching in English (9 cred.; sr.; prereq. consent of instructor)				
		VIII	TTh(f,w)	210Bu	Miss Smith
		VIII	TTh(s)	308F	Mr. Knower
Ed.T.66Amf‡§	The Teaching of Composition in the Senior High School (2 cred.; sr.)				
		VIII	TTh	210Bu	Miss Smith
Ed.T.66Ams‡§	*The Teaching of Composition in the Senior High School* (See Ed.T. 66Amf) *(Not offered)*				
Ed.T.66Bmw†§	The Teaching of Literature in the Senior High School (2 cred.; sr.)				
		VIII	TTh	210Bu	Miss Smith
Ed.T.67Af-67Bw-67Cs†‡§	Special Methods and Directed Teaching in Mathematics (9 cred.; sr.; prereq. Math. 50 or 60)				
		VIII	TTh	205aUHS	Mr. Drake
Ed.T.67Amf-67Bmw†‡§	The Teaching of Secondary School Mathematics (4 cred.; sr.; prereq. consent of instructor)				
		VIII	TTh	205aUHS	Mr. Drake
		and 1 hr. ar.			
Ed.T.68Af-68Bw-68Cs†‡§	Special Methods Course and Directed Teaching in Secondary School Science (9 cred.; sr.; prereq. consent of instructor)				
		IX	MW	6aPt	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.69Af-69Bw-69Cs†‡§	Special Methods and Directed Teaching in the Social Studies (9 cred.; sr.; prereq. 30 cred. in hist. or soc. sci. Consult instructor)				
		VIII	MW	100Pt	Mr. Wesley
		and 1 hr. ar.			
Ed.T.69Amf-69Bmw†‡§	Methods of Teaching the Social Studies (For students with a major in the social studies) (4 cred.; sr.; prereq. consent of instructor)				
		VIII	MW	100Pt	Mr. Wesley
Ed.T.70Af-70Bw-70Cs†‡§	Special Methods and Directed Teaching in German (9 cred.; sr.; prereq. German Comp. 50-51-52, German Conversation 53-54-55)				
		IX	TTh	114UHS	Miss Will
		and 1 hr. ar.			
Ed.T.71Af-71Bw-71Cs†‡§	Special Methods and Directed Teaching in Latin (9 cred.; jr., sr.; prereq. any two of Latin Courses 51-53 or equiv., 73)				
		IX	MW	112UHS	Miss Marlowe
		and 1 hr. ar.			
Ed.T.72Af-72Bw-72Cs†‡§	Special Methods and Directed Teaching in Romance Languages (9 cred.; sr.; prereq. French 49, 50-51-52, 53, [54-55 or 201] 63)				
		IX	TTh	206UHS	Miss Walker
		and 1 hr. ar.			

† 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.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.73Af-73Bw-73Cs†‡§	Special Methods and Directed Teaching in Commercial Subjects (9 cred.; sr.; prereq. consent of instructor) Fall—shorthand; winter—typewriting; spring—bookkeeping and junior business training	VIII and 1 hr. ar.	MW	111UHS	
Ed.T.74w‡§	Teachers Course in Journalism (3 cred.; jr., sr.; prereq. Jour. 41 or 51)	VII	MWF	10P	Mr. Kildow
Ed.T.75f,s‡	Methods and Observation in the Nursery School (3 cred.; sr.; prereq. Ed.T. 55, C.W. 40, Ed.T. 56, 57, 58, 59. Open only to students in home econ. and nursing ed.)	IV	T and ar	Ar	Miss Matson
Ed.T.76Af-76Bw-76Cs†‡§	Methods and Observation (3 cred.; sr.; prereq. Psy. 1-2)	IV	T	202Pt	Mrs. Cummings, Miss Headley, Miss Mattson
Ed.T.77Af-77Bw-77Cs†‡§	Directed Teaching in Kindergarten or Nursery School (9 cred.; sr.; prereq. Ed.T. 55 to 59 and 76A-B-C)	II	M	100Pt	Mrs. Foster
Ed.T.78Af-78Bw	Methods in Primary Grades (4 cred.; jr., sr.)	I-II	S	Ar	Ar
Ed.T.81f‡	Techniques of Puppetry (3 cred.; jr., sr.; prereq. Ed. 51A)	III-IV and 1 hr. ar.	S	Ar	Mrs. Meader
Ed.T.85Af-85Bw-85Cs†‡§	Practice and Field Work in Recreation Leadership (6 cred.; sr.; prereq. Soc. 146, 147)	Ar	Ar	Ar	Mr Haislet
Ed.T.88Af-88Bw-88Cs†‡§	Special Methods and Directed Teaching in Speech (9 cred.)	IX(f) VIII(s)	TTh	308F	Mr. Knower
		VIII(f,w)	TTh	210Bu	Miss Smith
Ed.T.89Amf-89Bmw†‡§	Methods of Teaching the Social Studies (For students with minors in one of the social studies (4 cred.; prereq. a minor in soc. sci.)	III	MW	100Pt	Mr. Wesley

MUSIC EDUCATION

Major advisers.—Professor Scott; Associate Professor Pepinsky; Instructor Hazel B. Nohavec.

Note.—Students following the Music Education Curriculum may elect seven credits in music in addition to the requirements of their curriculum. All other electives must be in academic subjects:

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.1f	Music Orientation (No cred.; freshmen majoring in music education; no prereq.)	V	TTh	4Mu	Mrs. Nohavec, Mr. Ferguson, and others

† 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.

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.4f-5w-6s‡	Applied Instrumental Technique (6 cred.; soph.; no prereq.)				
		I	MTWF	4Mu(f)	Mr. Pepinsky
		VIII	MTWF	4NMA(w,s)	Mr. Prescott
Mu.Ed.50Af‡	Primary Methods (2 cred.; jr.; no prereq.)				
		III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.50Bw‡	Intermediate Methods (2 cred.; prereq. Mu.Ed. 50A)				
		III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.52s‡	Technique of Teaching Appreciation (1 cred.; jr.; prereq. Ed. 51A)				
		III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.53s‡	High School Methods (3 cred.; jr.; prereq. Ed. 51A and Mu.Ed. 50A,B)				
		III	MWF	4Mu	Mrs. Nohavec
Mu.Ed.54w‡	Operetta Production (3 cred.; jr.; prereq. Ed. 51A)				
		III	MWF	4Mu	Mrs. Nohavec
Mu.Ed.55w‡	Survey and Evaluation of Vocal Materials and Methods (4 cred.; sr.; prereq. Mu.Ed. 50A, 50B, 53)				
		VI	MTWF	4Mu	Mrs. Nohavec
Mu.Ed.59w‡¶	Choral Literature and Conducting (2 cred. for seniors; 1 cred. for fr., soph., jr.)				
		V	TTh	106Pt	Mrs. Nohavec
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)				
		III-IV	S	4Mu	Mrs. Nohavec
Mu.Ed.63f‡	Band Conducting (2 cred.; jr., sr.; prereq. 4-5-6)				
		VI	TTh	4NMA	Mr. Prescott
Mu.Ed.64s‡	Band Organization (3 cred.; sr.; prereq. 4-5-6)				
		VI	MWF	4NMA	Mr. Prescott
Mu.Ed.65w‡	Instrumentation (3 cred.; jr.; prereq. Phys. 15)				
		II	TThS	4Mu	Mr. Pepinsky
Mu.Ed.68s	Conducting of Instrumental Music and Survey of Materials (4 cred.; sr.; prereq. Mu.Ed. 65)				
		I-II	MWF	5NMA	Mr. Pepinsky
Mu.Ed.70f	Accompanying and Sight Reading (2 cred.; jr., sr.)				
		III	TTh	3Mu	Mr. Scott
Mu.Ed.101s	Tests and Measurements in Music (2 cred.; sr., grad.; prereq. permission of instructor)				
		VI	TTh	4Mu	Mrs. Nohavec

For Graduate Students Only

Mu.Ed.220Ew	Survey and Application of Research in Music Education (3 cred.; prereq. Mu.Ed. 101)				
		Ar	Ar	Ar	Mrs. Nohavec
Mu.Ed.224Es	Seminar and Individual Research Problems in Music Education (3 cred.)				
		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

NURSING EDUCATION

Major adviser.—Professor Densford.

For other courses in Nursing see the Bulletins of the School of Nursing and the Medical School. For courses in Nursing Education and in Public Health Nursing see pages 84-87. For specialized curricula in Nursing Education and Public Health Nursing see the College of Education Bulletin.

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

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

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done, are prerequisite to registration in this course.

¶ Four credits are required for Mu.Ed. 59. This course should be repeated until all four credits are earned.

No.	Title	Hour	Day	Bldg.	Instructor
Nu.60§	Ward Administration (4 cred.; sr. nurse or grad. nurse; no prereq.)				
		VI-VII	TTh	Ar	Miss Densford and others
Nu.63§	Motion Study (2 cred.)				
		VI, VII, VIII	Th	202ME	Mr. Koepke
Nu.65§	Comparative Nursing Procedures (4 cred.; sr. or grad. nurse; prereq. permission of instructor)				
		VI-VII	T		Miss Petry
		VI-VII	Th	410MeS	and others
Nu.69§	Survey of Conditions and Trends in Nursing (3 cred.; sr., grad.; no prereq.)				
		IV	MWF	Ar	Miss Densford
Nu.71§	Curriculum Making in Schools of Nursing (3 cred.; sr., grad.; no prereq.)				
		VI	MWF	Ar	Miss Petry
Nu.72§	Teaching and Supervision in Schools of Nursing (3 cred.; sr., grad.; no prereq.)				
		VI	MWF	Ar	Miss Petry

PHYSICAL EDUCATION

The College of Education offers specialized curricula in Physical Education for Men and Physical Education for Women. For curricula see College of Education Bulletin. For schedule of courses see pages 13-21 in this bulletin.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

The College of Education offers specialized curricula in Public Health Nursing and Nursing Education. For curricula see College of Education Bulletin. For class schedule see pages 84-87 of this bulletin.

THEORY AND PRACTICE OF TEACHING

For courses formerly listed in this department, see General Courses, Curriculum and Instruction, and Methods and Directed Teaching.

§ Quarter arranged.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

All courses in the College of Agriculture, Forestry, and Home Economics are scheduled on the University Farm campus except those indicated by an asterisk (*).

AGRICULTURAL BIOCHEMISTRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f,w	Quantitative Methods (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.) (Limited to 35)	VI, VII, VIII, IX	MWF	102SnH	Ar
4f	Introduction to Organic and Biochemistry (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.§)	II	MTWThF	100GH	Mr. Reitz
4w	Introduction to Organic and Biochemistry (Same as 4f)	II	MTWThF	100GH	Mr. Reitz
5s	Plant Biochemistry (5 cred.; soph., jr., sr.; prereq. 4, Soils 6 advised)	II	MTWThF	100GH	Mr. Reitz
6f	Animal Biochemistry (5 cred.; soph., jr., sr.; prereq. 4, Soils 6 advised)	II	MTWThF	116SnH	Mr. Palmer

Junior and Senior Courses

101f-102w	Agricultural Quantitative Analysis (6 cred.; jr., sr.; prereq. 2)	VI, VII, VIII	MWF	208SnH	Mr. Briggs
103s	Dairy Chemistry (5 cred.; jr., sr.; prereq. 2, 6)				
	Lect.	VI	MWF	116SnH	Mr. Palmer
	Lab.	VII, VIII, IX	MWF	208SnH	Mr. Palmer
108s	Chemistry of Wheat and Wheat Products (3 cred.; jr., sr.; prereq. 5)	II	MWF	211SnH	Mr. Bailey, Mr. Geddes
110s	Flour Laboratory Methods (3 to 5 cred.; jr., sr.; prereq. 101-102 or equiv.)	VI, VII, VIII, IX	MWF	202SnH	Mr. Geddes
113f-114w-115s	Biochemical Laboratory Methods (6 cred.; jr., sr.; prereq. quant. anal., parallel 119-123)	VI, VII, VIII	TTh	202,208SnH	Mr. Sandstrom
116w	Advanced Animal Nutrition (3 cred.; jr., sr.; prereq. 6 or Physiol. Chem. 120 advised)	III	TThS	211SnH	Mr. Palmer, Miss Kennedy
117f,w,s	Laboratory Problems in Animal Nutrition (3 cred.; jr., sr.; prereq. 116, instructor's permission)	Ar	Ar	314SnH	Mr. Palmer, Miss Kennedy
118f,w,s	Laboratory Problems in Biochemistry (3 or 5 cred.; sr.; prereq. 113-114, 119; or 103 or 110)	Ar	Ar	Ar	Ar
119f	Colloids (3 cred.; sr.; prereq. Zool. or Bot. 9 cred., and 5 cred. in Org. Chem. 51-52-153)	III	MWF	113SnH	Mr. Gortner
120w	Proteins (3 cred.; sr.; prereq. 119)	II	MWF	113SnH	Mr. Gortner

§ By special permission of the student's adviser General College Courses 88, 89, 90 will be acceptable as prerequisites.

No.	Title	Hour	Day	Bldg.	Instructor
121w	Carbohydrates (3 cred.; sr.; prereq. 119)				
		III	MWF	113SnH	Mr. Geddes
122s	The Lipids and Fats (3 cred.; sr.; prereq. 119)				
		III	TThS	113SnH	Mr. Briggs
123s	Enzymes (3 cred.; sr.; prereq. 119)				
		III	MWF	113SnH	Mr. Sandstrom

AGRICULTURAL ECONOMICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Principles of Economics I (3 cred.; soph., jr., sr.; no prereq.) (Sections limited to 60 each)				
	Sec. 1	I	MWF	109HH	Mr. Lowe
	2	I	TThS	109HH	Mr. Lowe
1w	Principles of Economics I (Same as 1f) (Sections limited to 60 each)				
	Sec. 1	I	TThS	100HH	Mr. Peterson
	2	III	MWF	109HH	Mr. Lowe
2w	Principles of Economics II (5 cred.; soph., jr., sr.; prereq. 1) (Sections limited to 60 each)				
	Sec. 1	I	MTWThF	109HH	Mr. Lowe
	2	III	MTWThF	204So	Mr. Peterson
2s	Principles of Economics II (Same as 2w) (Sections limited to 60 each)				
	Sec. 1	I	MTWThF	109HH	Mr. Peterson
	2	III	MTWThF	109HH	Mr. Lowe
3f,w,s	Principles of Economics (Home Economics) (5 cred.; soph., jr., sr.; no prereq.) (Sections limited to 60 each)				
		II	MTWThF	109HH	Mr. Lowe
7w	Natural Resources (3 cred.; soph., jr., sr.; no prereq.)				
		III	TThS	109HH	Mr. Dowell
8s	Rural Economics (3 cred.; soph., jr., sr.; prereq. 2 or 3)				
		III	TThS	311HH	Mr. Jesness
25f,w	Principles of Accounting (4 cred.; soph., jr., sr. in agr., for., and home econ. only) (Limited to 50)				
	Lect.	II(f)	MWF	311HH	Mr. Koller
		II(w)	TThS	311HH	
	Lab.	VIII, IX	Th	311HH	
30f	Agricultural Prices (3 cred.; soph., jr., sr.; prereq. 2)				
		II	TThS	312HH	Mr. Peterson
40f,s	Principles of Marketing Organization (3 cred.; soph., jr., sr.; prereq. 2)				
		I(f)	MWF	312HH	Mr. Cox
		II(s)	MWF	312HH	Mr. Cox
47s	Marketing Accounting (4 cred.; soph., jr., sr.; prereq. 25)				
	Lect.	IV	MWF	311HH	Mr. Koler
	Lab.	VIII, IX	F	311HH	

Junior and Senior Courses

50f§	Farm Finance (5 cred.; jr., sr. in agr. or for. only; prereq. 2)				
		IV	MTWFS	312HH	Mr. Koller
80s	Farm Management (3 cred.; jr., sr.)				
		I	TThS	312HH	Mr. Engene
90f§	Agricultural Statistics (5 cred.; jr., sr.)				
	Lect.	III	TThS	312HH	Mr. Cox
	Lab.	Ar	Ar		
102w	Farm Organization (3 cred.; jr., sr.; prereq. 2) (Limited to 60)				
		II	TThS	210HH	Mr. Pond
103s	Farm Operation (3 cred.; jr., sr.; prereq. 102) (Limited to 60)				
		II	TThS	100HH	Mr. Pond
104s	Types of Farming (3 cred.; jr., sr.; prereq. 2)				
		III	MWF	312HH	Mr. Pond

§ Open to sophomores on petition.

No.	Title	Hour	Day	Bldg.	Instructor
110f-111w	Economics of Agricultural Production I and II (6 cred.; jr., sr.; prereq. 2)				
		I	TThS	312HH	Mr. Dowell
126f,s	Economics of Consumption (3 cred.; jr., sr.; prereq. 2 or 3)				
		I	TThS	100HH	Mr. Waite
131w	Market Prices (3 cred.; jr., sr.; prereq. 30, 40)				
		III	TThS	312HH	Mr. Waite
135s	Methods of Price Analysis (3 cred.; sr.; prereq. 30, 191)				
		III	TThS	312HH	Mr. Waite
140f	Marketing Organization: Staples (3 cred.; jr., sr.; prereq. 40)				
		III	MWF	312HH	Mr. Cox
141w	Marketing Organization: Dairy and Poultry Products (3 cred.; jr., sr.; prereq. 40)				
		II	MWF	312HH	Mr. Jesness
142s	Marketing Organization: Fruits and Vegetables (2 cred.; jr., sr.; prereq. 40)				
		III	MW	311HH	Mr. Cox
143w	Marketing Organization: Livestock and Meats (3 cred.; jr., sr.; prereq. 40)				
		III	MWF	312HH	Mr. Dowell
144f	Co-operative Organization (3 cred.; jr., sr.; prereq. 40)				
		II	TThS	311HH	Mr. Jesness
150s	Advanced Farm Finance (3 cred.; jr., sr.; prereq. 50 or equiv.)				
		2:30-4:00 p.m.	TTh	312HH	Mr. Jesness, Mr. Koller
170s	Land Economics (3 cred.; jr., sr.; prereq. 110)				
		1:30-3:00 p. m.	WF	312HH	Mr. Dowell
191w	Advanced Agricultural Statistics (3 cred.; jr., sr.; prereq. 90)				
		IV	MWF	312HH	Mr. Waite

See also Economics and Business Administration.

AGRICULTURAL ENGINEERING

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
3f,w,s	Mechanical Drawing (3 cred.; no prereq.) (Sections limited to 60 each; fall sections open to foresters only)				
	Sec. 1	III, IV(f,w)	MWF	303En	Mr. Neubauer
		VII, VIII(s)	MWF	303En	
	2	I, II(f)	TThS	303En	
4s	General Woodworking (3 cred.; no prereq.)				
	Lect.	I	MWF	41En	Mr. Christopherson
	Lab. Sec. 1	VI, VII, VIII	W	48En	
	2	VI, VII, VIII	Th	48En	
5f	Farm Structures Laboratory (3 cred.; no prereq.; for prof. agr. eng. only)				
	Lect.	I	TS	41En	Mr. Christopherson
	Lab.	II, III	TS	48En	
7s	Building (3 cred.; no prereq.)				
		IV	MWF	305En	Mr. White
11w	Applied Mathematics (5 cred.; no prereq.) (Sections limited to 20 each)				
	Sec. 1	III	MTWThF	105En	Mr. Neal,
	2	III	MTWThF	106En	Mr. Park
	3	IV	MTWFS	106En	
12s	Agricultural Machinery (3 cred.; no prereq.)				
		I	MWF	216En	Mr. Schwantes
13f,s	Gas Engines (3 cred.; no prereq.) (Limited to 40)				
		VI, VII, VIII(f)	MW	216,37En	Mr. Torrance
	Sec. 1	VI, VII, VIII(s)	WF		
	2	III, IV(s)	MWF		
		VIII(s)	WF		

No.	Title	Hour	Day	Bldg.	Instructor
14f	Tractors (3 cred.; prereq. 13)				
	Lect.	II	TTh	216En	Mr. Torrance
	Lab.	VI, VII, VIII, IX	F	37En	
18s	Agricultural Automotives (4 cred.; prereq. Phys. 7; prof. agr. eng. only)				
	Lect.	VI	TTh	216En	Mr. Torrance,
	Lab.	VII, VIII, IX	TTh	37En	Mr. Strait
19f	Elementary Surveying (3 cred.; prereq. 3, 11 or trignometry) (Sections limited to 30 each)				
	Lect.	IV	T	105En	Mr. Neal, Mr. Park
	Lab. Sec. 1	VI, VII, VIII	TTh	305En	Mr. Neal,
	2	VI, VII, VIII	WF	305En	Mr. Park
19s	Elementary Surveying (Same as 19f)				
	Lect.	VI	T	105En	Mr. Neal, Mr. Park
	Lab.	VII, VIII, IX	TTh	305En	Mr. Neal, Mr. Park
20f	Advanced Surveying (3 cred.; prereq. 19) (Limited to 45)				
	Lect.	IV	M	105En	Mr. Roe, Mr. Neal
	Lab.	VII, VIII, IX	M	305En	Mr. Neal,
		VI, VII, VIII	W		Mr. Park
20s	Advanced Surveying (Same as 20f)				
	Lect.	VI	M	105En	Mr. Roe, Mr. Neal
	Lab.	VII, VIII, IX	MF	305En	Mr. Neal, Mr. Park
21s	Elements of Surveying (4 cred.; prereq. Draw. 3 and M. & M. 12; for prof. agr. eng. only)				
	Lect.	VI	F	105En	Mr. Roe. Mr. Neal
	Lab.	VI, VII, VIII	MW	305En	Mr. Roe
		VII, VIII, IX	F	305En	
22s	Agricultural Machinery Laboratory (1 cred.; prereq. 12 or parallel)				
		VI, VII, VIII	W	105En	Mr. Schwantes
23f	General Physics (5 cred.; no prereq.) (Lab. sections limited to 20 each) (Not open for credit to students offering one unit of high school physics for entrance)				
	Lect.	III	TThS	101En	Mr. Hustrulid
	Lab. Sec. 1	I, II	ThS	102En	Mr. Hustrulid
	2	VI, VII	TTh	102En	Mr. Tyler
23s	General Physics (Same as 23f) (Lab. sections limited to 20 each)				
	Lect. Sec. 1	III	TThS	101En	Mr. Hustrulid
	2	IV	MWF	101En	Mr. Hustrulid
	Lab. Sec. 1	I, II	WF	102En	Mr. Hustrulid
	2	I, II	TS	102En	Mr. Hustrulid
	3	VI, VII	TTh	102En	Mr. Tyler
	4	VI, VII, VIII, IX	M	102En	Mr. Tyler
	5	VI, VII, VIII, IX	W	102En	Mr. Tyler
	6	III, IV	MW	102En	Mr. Tyler
24f	Agricultural Physics I (4 cred.; prereq. Math. 6 or equiv.) (Lab. sections limited to 16 each)				
	Lect.	III	MWF	107En	Mr. Hustrulid
	Lab. Sec. 1	VI, VII	M	102En	Mr. Hustrulid
	2	VIII, IX	M	102En	Mr. Hustrulid
	3	VI, VII	W	102En	Mr. Hustrulid
	4	VI, VII	F	102En	Mr. Hustrulid
	5	VIII, IX	F	102En	Mr. Hustrulid

No.	Title	Hour	Day	Bldg.	Instructor
25w	Agricultural Physics II (4 cred.; prereq. 24)				
	Lect.	I	TThS	107En	Mr. Hustrulid
	Lab. (Same as 24f)			102En	
28w	Land Clearing (3 cred.; no prereq.) (Offered only in even numbered years, 1939-40 etc.)				
		I	TThS	105En	Mr. Schwantes
31w,s	Principles of Drainage (3 cred.; no prereq.)				
		II(w)	MWF	105En	Mr. Roe
		I(s)	MWF	105En	Mr. Neal
32w	Elements of Supplemental Irrigation (3 cred.; no prereq.) (Offered only in odd numbered years, 1940-41, etc.)				
		I	TThS	105En	Mr. Roe, Mr. Park
35w	Household Physics (3 cred.; prereq. 23 or equiv. or G.C. 88)				
		I, II	MWF	103En	Mr. Hustrulid
37f,s	Rural Sanitation and Water Supply (3 cred.)				
		I(f)	TThS	101En	Mr. Tyler
	(Prereq. M.&M. 129; for prof. agr. eng. only)	I(s)	MWF	101En	Mr. Tyler
40f,s	Mechanical Training (3 cred.; no prereq.)				
		I, II	MWF	20,106En	Mr. Dent
41w	Metal Work (3 cred.; no prereq.)				
		I, II	MWF	20,106En	Mr. Dent, Mr. Strait
43s	Mechanical Laboratory (3 cred.; no prereq., for prof. agr. eng. only)				
		I, II	TThS	20,106En	Mr. Dent, Mr. Strait
44s	Advanced Drawing (2 cred.; prereq. 3 or Draw. 3)				
	Lect.	I	T	303En	Mr. Neubauer
	Lab.	Ar	Ar	303En	

Junior and Senior Courses

51w	Land Reclamation (5 cred.; prereq. 21 or parallel, Soils 6, M.&M. 129; jr. and sr. prof. agr. eng. only) (Offered only in even numbered years, 1939-40 etc.)				
		VI	MTWThF	105En	Mr. Roe, Mr. Neal, Mr. Park
52f	Elements of Farm Machinery (3 cred.; prereq. M.&M. 26; prof. agr. eng. only)				
	Lect.	VII	WF	216En	Mr. Schwantes
	Lab.	VII, VIII, IX	M	49En	
53s	Farm Structures (3 cred.; prereq. 5, Draw. 3 or equiv.; prof. agr. eng. only)				
	Lect.	II	TS	305En	Mr. White
	Lab.	III, IV	TS	305En	
67f	Advanced Farm Structures Design (3 cred.; prereq. 53, M.&M. 128; prof. agr. eng. only)				
	Lect.	I	T	305En	Mr. White,
	Lab.	I, II	ThS	305En	Mr. Neubauer
		II	T	305En	
70s	Steam Boilers and Engines (3 cred.; prereq. 24)				
		II	MWF	216En	Mr. Strait
71f	Design and Economics of Agricultural Machinery (3 cred.; prereq. 18, 52 M.E. 27; prof. agr. eng. only)				
	Lect.	VI, VII	T	105En	Mr. Schwantes
	Lab.	VI, VII, VIII	Th	49En	Mr. Schwantes
72s	Applied Electricity (3 cred.; prereq. Phys. 9, or 43, 44; jr., sr. prof. agr. eng. only) (Offered only in odd numbered years, 1940-41, etc. Alternates with Agr. Eng. 73)				
	Lect.	III	MF	101En	Mr. Hustrulid
	Lab.	VI, VII, VIII, IX	W	Ar	

No.	Title	Hour	Day	Bldg.	Instructor
73s	Steam Boilers and Heat Engines (3 cred.; prereq. 18 and M.E. 31; prof. agr. eng. only) (Offered only in even numbered years, 1939-40, etc. Alternates with Agr. Eng. 72)				
	Lect.	III	MF	216En	Mr. Strait
	Lab.	VI, VII, VIII, IX	W	37En	
101f,102w,103s	Advanced Drainage Problems (2 to 6 cred. per qtr.; sr.; prereq. 51)				
		Ar	Ar	Ar	Mr. Roe, Mr. Neal
111f,112w,113s	Farm Building Problems (2 to 6 cred. per qtr.; prereq. 67)				
		Ar	Ar	305En	Mr. White, Mr. Neubauer, Mr. Christopherson
121f,122w,123s	Farm Power and Machinery Problems (2 to 6 cred. per qtr.; jr., sr.; prereq. 126)				
		Ar	Ar	Ar	Mr. Schwantes
126w	Selection and Management of Agricultural Machinery (3 cred.; jr., sr.; prereq. 18, 71, Agr. Econ. 102)				
	Lect.	III	MW	103En	Mr. Schwantes
	Lab.	3 hrs. ar.			

AGRONOMY AND PLANT GENETICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,s	General Farm Crops (3 cred.; no prereq.)				
		IV	MWF	107En	Mr. Johnson
21w	Grain Crops (4 cred.; soph., jr., sr.; prereq. 1)				
	Lect.	VI	MWF	107En	Mr. Wilson
	Lab.	VII	MWF	102Ad	Mr. Wilson
22s	Grain and Hay Grading (3 cred.; soph., jr., sr.; prereq. 1)				
		I, II	MWF	100Ad	Mr. Wilson
23f	Forage Crops (4 cred.; soph., jr., sr.; prereq. 1)				
		VI, VII	MWF	100Ad	Mr. Arny
31f,w	Principles of Genetics (4 cred.; soph., jr., sr.)				
	Lect.	I	TThS	217En	Mr. Immer
	Lab.	Ar	Ar		Mr. Rinke, Mr. Murphy

Junior and Senior Courses

124s	Problems in Farm Crops (3 cred.; jr., sr.; prereq. 1, 31, and at least two courses from groups 21, 23, 132, 134. Seniors and special students may register in course with approval of instructor)				
		III	MWF	102Ad	Mr. Wilson
126f	Crop Judging (3 cred.; jr., sr.; prereq. 22)				
		VI, VII	MWF	102Ad	Mr. Wilson
132w	Farm Crops Plant Breeding (4 cred.; jr., sr.; prereq. 31)				
		VI, VII, VIII	TTh	102Ad	Mr. Johnson
133s	Pasture Crops and Management (3 cred.; jr., sr.; prereq. 23)				
		IV	MWF	100Ad	Mr. Arny
134s	Seminar in Agronomy (2 cred.; sr.; prereq. 9 cred.)				
		Ar	Ar	Sem.Ag.	Staff

ANIMAL AND POULTRY HUSBANDRY

ANIMAL HUSBANDRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w	Market Livestock Production (6 cred.; no prereq.)				
		I, II	MWF	CSt	Mr. Peters, Mr. Harvey

No.	Title	Hour	Day	Bldg.	Instructor
1w-2s	Market Livestock Production (Same as 1f-2w)				
		I, II	TThS	CSt	Mr. Ferrin, Mr. Harvey
1s-2f	Market Livestock Production (Same as 1f-2w)				
	1s	I, II	MWF	CSt	Mr. Harvey
	2f	I, II	TThS	CSt	Mr. Johnson
3f-4w	Breeds of Livestock (6 cred.; soph., jr., sr.; prereq. 1-2)				
		III, IV	TS	WSt	Mr. Ferrin,
		III	Th		Mr. Winters
5s	Livestock Judging (3 cred.; soph., jr., sr.; prereq. 3-4)				
		III, IV	MWF	CSt	Mr. Harvey

Junior and Senior Courses

50s	Fundamentals of Livestock Production (3 cred.; jr., sr. in forestry or prof. agr. eng. only; no prereq.)				
	For.	II	MWF	3St	Mr. Ferrin
	Prof. agr. eng.	I	TThS	3St	Mr. Ferrin
51w	Meat Selection (3 cred.; jr., sr.; prereq. 1-2)				
		VI, VII, VIII	WF	MS	Mr. Anderson
52s	Meats (3 cred.; jr., sr.; prereq. 1-2, 51)				
		VI, VII, VIII	TTh	MS	Mr. Anderson
53f	Advanced Meats (3 cred.; jr., sr.; prereq. 52)				
		VI, VII, VIII	TTh	MS	Mr. Anderson
54w	Utilization of Meats (3 cred.; jr., sr. home econ. students; no prereq.)				
		III	ThS	MS	Mr. Anderson
		III, IV	T		
56f-57w	Livestock Feeding (6 cred.; jr., sr.; prereq. 1-2)				
		III	MWF	3St	Mr. Ferrin
101f	Advanced Stock Judging (3 cred.; jr., sr.; prereq. 5)				
		VI, VII	MWF	CSt	Mr. Harvey
107s	Meat Problems (3 cred.; jr., sr.; prereq. 53)				
	Lect.	IV	TS	MS	Mr. Anderson
	Lab.	VI, VII, VIII	F	MS	
108s	Seminar (3 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	3St	Mr. Peters
112w	Animal Breeding (3 cred.; jr., sr.; prereq. Agron. 31)				
		IV	MWF	3St	Mr. Winters
113s	Livestock Management (3 cred.; jr., sr.; prereq. 3-4)				
		III	MWF	3St	Mr. Peters
115f	The Marketing of Livestock (3 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	3St	Mr. Peters

POULTRY HUSBANDRY

Freshman and Sophomore Courses

1w	Poultry Production (3 cred.; soph.; no prereq.)				
		IV	MWF	102Ve	Mr. Sloan
2w	Poultry Breeds, Varieties, and Culling (3 cred.; prereq. 1 or parallel)				
		VII, VIII	TTh	102Ve	Mr. Canfield

Junior and Senior Courses

50w,s	Poultry Problems (2 to 6 cred.; jr., sr.; prereq. 6 cred. in poultry husbandry)				
		Ar	Ar	Ar	Mr. Sloan
51s	Incubation, Brooding, and Breeding (4 cred.; jr., sr.; prereq. 1, Agron. 31)				
		III	MWF	102Ve	Mr. Canfield
52f	Poultry Judging and Marketing (3 cred.; jr., sr.; prereq. 2)				
		VII, VIII	TTh	102Ve	Mr. Canfield

No.	Title	Hour	Day	Bldg.	Instructor
103f	Poultry Feeding and Management (3 cred.; jr., sr.; prereq. 1, Agr. Biochem. 4)	IV	MWF	103Ve	Mr. Sloan
104f	Seminar (2 cred.; sr.; prereq. 9 cred. in poultry husbandry including 51s or 103f)	Ar	Ar	Ar	Mr. Sloan

DAIRY HUSBANDRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,s	Elements of Dairying (5 cred.; prereq. entrance credit in chem. or Inorg. Chem. 1 or 9) (Limited to 75)	III	MTWThF	100HH	Mr. Combs
2w	Dairy Bacteriology (3 or 5 cred.; 3 cred. for lecture, 2 cred. for lab.; soph., jr., sr.; prereq. Bact. 41) (Lecture taken separately only on permission of instructor)				
	Lect.	VI	MWF	210HH	Mr. Macy
	Lab.	VII-VIII	MWF	212HH	Mr. Olson
3f	Testing Dairy Products (1 cred.; prereq. 1)	VII, VIII	M	210HH	Mr. Olson
4s	Dairy Products Practice (3 cred.; soph., jr., sr.; prereq. 1)	Ar	Ar	Ar	Mr. Combs
9s	Dairy Cattle Judging (1 cred.; soph., jr., sr.; no prereq.)	VI, VII, VIII	F	DB	Mr. Allen
10s	Dairy Products Judging (1 cred.; soph., jr., sr.; prereq. 1)	Ar	Ar	20HH	Mr. Coulter
20s	Household Microbiology (4 cred.; 3rd qtr. fresh. soph., jr., sr.; prereq. approval of adviser and permission of instructor; limited to 80)	VI	MF		
		VI, VII	W	100HH	Mr. Macy

Junior and Senior Courses

51s	Market Milk (3 cred.; jr., sr.; prereq. 1, 2)	IV	MW	210HH	Mr. Macy
		VI, VII, VIII	Th		
101f	Milk Production (5 cred.; jr., sr.; prereq. 1)	IV	MTWFS	210HH	Mr. Fitch
103w	Dairy Stock Feeding (3 cred.; sr., prereq. 101, Agr. Biochem. 6) (Only 2 credits allowed to those who have completed An. Husb. 56-57)	III	MWF	210HH	Mr. Fitch
104f	Dairy Stock Selection (2 cred.; jr., sr.; prereq. 9, 101 or parallel)	VI, VII, VIII	TTh	210HH	Mr. Allen
105f	Seminar I (1 cred.; sr.; prereq. 3 courses in dairy husbandry)	II	S	214HH	Mr. Fitch, Mr. Macy
106w	Seminar II (1 cred.; sr.; prereq. 105)	II	S	214HH	Mr. Fitch, Mr. Macy
110w	Dairy Products III (3 cred.; jr., sr.; prereq. 1, 3)	IV	TS	210HH	Mr. Combs,
		VI, VII, VIII	T		Mr. Coulter
111f	Dairy Products I (3 cred.; jr., sr.; prereq. 1, 2, 3)	VI	MW	210HH	Mr. Combs,
		VI, VII, VIII	F		Mr. Coulter
112s	Dairy Products II (3 cred.; jr., sr.; prereq. 1, 2, 3)	IV	TS	210HH	Mr. Combs
		VI, VII, VIII	T	210HH	Mr. Coulter
113s	Technical Control (3 cred.; sr.; prereq. 2, 111 or 112)	I, II, III	TTh	210HH	Mr. Coulter, Mr. Olson

No.	Title	Hour	Day	Bldg.	Instructor
115s	Advanced Dairy Bacteriology (3 cred.; sr.; prereq. 2, 111 or 112)	I, II	MWF	212HH	Mr. Macy
116s	Milk Secretion (3 cred.; sr.; prereq. Physiol. 9 cred. and Agr. Biochem. 103)	I	MWF	214HH	Mr. Petersen
117s	Dairy Cattle Breeding (3 cred.; jr., sr.; prereq. 101, 104, Agron. 31)	VI, VII, VIII	MW	210HH	Mr. Petersen

For course in Dairy Chemistry see Agricultural Biochemistry 103, page 128.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
5f,w	Economic Entomology (5 cred.; soph., jr., sr.; prereq. Zool. 14-15 or equiv.) (Section limited to 36)	VI, VII, VIII	MWF	301,302Ad	Mr. Ruggles
13su	Field Zoology (1 cred.; no prereq.)	Given at Itasca Park			Mr. Mickel, Mr. Hodson
14f,s-15w-16s	Principles of Beekeeping (2 to 6 cred.; no prereq.)				
	(14f-15w-16s)	IV	MF	307Ad	Mr. Tanquary
	(14s)	III	MF		
17f,s-18w-19s	Beekeeping Practice (1 to 3 cred.; prereq. 14-15 or parallel)	II, III, IV or ar.	W	307Ad	Mr. Tanquary, Mr. Haydak
20f,w,s	Advanced Beekeeping (2 to 6 cred.; prereq. 14 to 19 and 5 cred. in ent.)	Ar	Ar	Ar	Mr. Tanquary
49s	Introductory Entomology (3 cred.; fr., soph.; prereq. Zool. 14-15 or equiv.)	VI, VII, VIII	TTh	302Ad	Mr. Mickel

Junior and Senior Courses

No.	Title	Hour	Day	Bldg.	Instructor
51f*§	Introductory Parasitology (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall)	VI, VII, VIII	MWF	208Z	Mr. Riley
52w*§	Introductory Entomology (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited to 20 each)				
	Lect.	VI	MWF	211Z	Mr. Mickel
	Lab. Sec. 1	VII, VIII	MWF	402Z	
	2	VI, VII, VIII	TTh	402Z	
56f,w	Forest Entomology (3 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited to 30)	VI, VII, VIII	WF	307Ad	Mr. Hodson
61s	Forest Zoology (3 cred.; jr., sr.; prereq. Zool. 1-2-3)	Given at Cloquet			Mr. Hatfield
62su	Wildlife Conservation Principles and Administration (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.)	Given at Itasca Park			Mr. Swanson
64w	Economic Vertebrate Zoology (3 cred.; jr., sr.; prereq. Zool. 1-2-3)	I	MWF	301Ad	Mr. Swanson
114s	Apiculture (3 cred.; jr., sr.; prereq. 9 cred. in entomology)	I, 2 hrs. ar.	MW	307Ad	Mr. Tanquary, Mr. Haydak
117f-118w-119s*	General Ecology (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)	VI, VII, VIII	TTh	211Z, 301Ad(w)	Mr. Eddy, Mr. Hodson
120s	General Ecology of Insects (3 cred.; jr., sr.; alternative to 119s, or both may be taken; prereq. 117f-118w)	VI, VII, VIII	TTh	307Ad	Mr. Hodson

* Offered on the Minneapolis campus.
§ Open to sophomores on petition.

No.	Title	Hour	Day	Bldg.	Instructor
125f-126w-127s*	Advanced General Entomology (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)				
	Lect.	I	TTh	211Z	Mr. Mickel
	Lab.	I, II, III	S	402Z	
139f-140w	Histology and Development of Insects (9 cred.; jr., sr.; prereq. 125-126-127 or equiv.)				
		Ar	Ar	Ar	Mr. Riley
141f-142w	Insects in Relation to Plant Diseases (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)				
		III, IV	TThS	302Ad	Mr. J. J. Christensen, Mr. Granovsky
144w-145s-146s*	Animal Parasites and Parasitism (3 to 9 cred.; jr., sr.; prereq. Zool. 9 cred.)				
		VI, VII, VIII	WF	208Z	Mr. Riley
150s	Introduction to Aphidology (3 cred.)				
		Ar	Ar	Ar	Mr. Granovsky
161f	Waterfowl and Upland Game Birds (3 cred.; jr., sr.; prereq. Zool. 46-47 or equiv.)				
		III, IV	TS	301Ad	Mr. Swanson
		III	Th		
163f	Mammalogy (3 cred.; jr., sr.; prereq. Zool. 22)				
		IV	MWF	301Ad	Mr. Hatfield
165w	Game Management (3 cred.; jr., sr.; prereq. 62, 64, 163)				
		I	TThS	307Ad	Mr. Swanson
166s	Methods in Field Zoology (3 cred.; jr., sr.; prereq. 163, 165)				
		VI, VII, VIII	TTh	301Ad	Mr. Swanson
175f	Insecticides and Their Action (4 cred.; sr.; prereq. inorg. and org. chem.)				
		I	MWF	302Ad	Mr. Shepard
		Lab. hrs. ar.			
176w	Advanced Economic Entomology (6 cred.; sr.; prereq. 5 or 56, Zool. 117-118-119 or equiv.)				
		I	MWF	302Ad	Mr. Ruggles
197f,w,s,su	Introduction to Research (5 or more cred.; sr.; prereq. work as prescribed by the division)				
		Ar	Ar	Ar	Mr. Riley, Mr. Ruggles, Mr. Tanquary, Mr. Granovsky, Mr. Mickel, Mr. Shepard, Mr. Swanson

FORESTRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	General Forestry (3 cred.; no prereq.)				
		III	TThS	100GH	Mr. Cheyney
2su	Field Dendrology (1 cred.; no prereq.)				
		Given at Itasca Park			
3w	Dendrology (3 cred.; no prereq.)				
		III	TThS	100GH	Mr. Schmitz
4s	Dendrology (4 cred.; no prereq.)				
	Lect.	III	MWF	100GH	Mr. Schmitz
	Lab.	Ar	Ar	Ar	Mr. Rees
5su	Field Silviculture (2 cred.; no prereq.)				
		Given at Itasca Park			Mr. Cheyney
6su	Field Mensuration (1 cred.; no prereq.)				
		Given at Itasca Park			Mr. Brown
7f-8w-9s	Forest Mensuration (9 cred.; all; prereq. 6, Math. 1 and 6)				
	Lect.	IV	MW	100GH	Mr. Brown
	Lab. Sec. 1	VI, VII, VIII	M	206GH	
	2	VI, VII, VIII	W	206GH	
	3	II, III, IV	S	206GH	

* Offered on the Minneapolis campus.

No.	Title	Hour	Day	Bldg.	Instructor
10w	Farm Forestry (3 cred.; no prereq.; not open to students majoring in forestry)	VI	MWF	203GH	Mr. Cheyney
11su	Camp Management (1 cred.; no prereq.)	Given at Itasca Park			
20w	Grazing (3 cred.; soph., jr., sr.; no prereq.)	II	TThS	203GH	Mr. Allison
49s	House and Furniture Woods (2 cred.; soph., jr., sr.; no prereq.; not open to students majoring in forestry)	III, IV	TS	211GH	Mr. Rees

Junior and Senior Courses

53f-54w	Wood Structure and Identification (6 cred.; jr., sr.; prereq. 3-4)				
	Sec. 1	VI, VII, VIII	WF	211GH	Mr. Rees
	2	VI, VII, VIII	TTh		
56s	Forest Products (3 cred.; jr., sr.)	I	MWF	203GH	Mr. Bailey
57f	Wood Utilization (3 cred.; sr.; prereq. 53-54)	II	MWF	203GH	Mr. Bailey
58w	Lumber Production and Distribution (3 cred.; sr.; prereq. 53-54, 152)	VI	MWF	201GH	Mr. Bailey
62f-63w	Forest Problems (4 cred.; sr. class)	I	WF	201GH	Mr. Brown
101w	Advanced Dendrology (3 cred.; jr., sr.; prereq. 3, 4)	Ar	Ar	Ar	Mr. Rees
111f-112w 111w-112s	Advanced Forest Mensuration (3 cred.; sr.; prereq. 9)				
	Lect.	Ar	Ar	206GH	Mr. Brown
	Lab.	Ar	Ar	206GH	
113f	Wood Pulp and Paper (3 cred.; jr., sr.; prereq. 53-54, Chem. 3 or 10)	III	MWF	201GH	Mr. Bailey
114f	Mechanical and Physical Properties of Wood (3 cred.; jr., sr.; prereq. 53-54, Math. 7)	I	TThS	201GH	Mr. Rees
115w-116s	Mechanical and Physical Properties of Wood (6 cred.; jr., sr.; prereq. 114)				
	115w	I, II	TThS	3GH	Mr. Rees
	116s	I, II	MWF	3GH	Mr. Rees
119s	Advanced Wood Structure I (4 cred.; sr.; prereq. 53-54)				
	Lect.	IX	M	209GH	Mr. Bailey
	Lab.	VI, VII, VIII	MWF	209GH	
125s	Wood Preservation (3 cred.; jr., sr.; prereq. 53-54)	III	MWF	201GH	Mr. Bailey
126f	Silvics (3 cred.; jr., sr.; no prereq.)	III	MWF	203GH	Mr. Cheyney
127w	Silviculture (3 cred.; jr., sr.; prereq. 126)	II	MWF	203GH	Mr. Cheyney
128s	Silviculture Laboratory (6 cred.; jr., sr.; prereq. 127)	Given at Cloquet			Mr. Cheyney
129f,w,s	American Silvicultural Practice (3 cred.; jr., sr.; prereq. 127)	Ar	Ar	Ar	Mr. Cheyney
130f	Forest Valuation (5 cred.; jr., sr.)	I	MTWThF	203GH	Mr. Allison
131w	Forest Policy and Administration (5 cred.; jr., sr.)	IV	MTWFS	203GH	Mr. Allison
132s	Forest Regulation Laboratory (6 cred.; jr., sr.)	Given at Cloquet			Mr. Allison
136f	Forest Economics (3 cred.; jr., sr.; prereq. 130, Agr. Econ. 2)	II	MWF	201GH	Mr. Allison
137w	Seeding and Planting (3 cred.; jr., sr.; prereq. 126 or 127)	III	TThS	203GH	Mr. Cheyney
140w	Forest Working Plans (3 cred.; sr.; prereq. 128, 132)	III	TThS	201GH	Mr. Allison

No.	Title	Hour	Day	Bldg.	Instructor
141f	Principles of Silvics (3 cred.; jr., sr.; prereq. 126)	IV	MWF	203GH	Mr. Cheyney
142s	Wood Chemistry (3 cred.; jr., sr.; prereq. Org. Chem. 52, For. 54)	II	TThS	201GH	Mr. Bailey
143s	Forest Recreation (3 cred.; jr., sr.)	III	TThS	203GH	Ar
144s	Forage and Browse Plants (3 cred.; jr., sr., grad.; prereq. Bot. 113 and P.P. 7)	Ar	Ar	Ar	Mr. Schmitz
151f,w,s	Logging (3 cred.; jr., sr.)	Ar	Ar	Ar	Mr. Brown
152s	Wood Seasoning (3 cred.; jr., sr.; prereq. 53-54)	I	TThS	201GH	Mr. Rees
155w	Forest Protection (3 cred.; jr., sr.; prereq. 127)	III	MWF	100GH	Mr. Hansen
220f-221w-222s	Major Report (2 cred. per qtr.; grad.)	Ar	Ar	Ar	Mr. Schmitz, Mr. Allison, Mr. Cheyney
223f-224w-225s	Literature Seminar (1 cred. per qtr.; grad.)	7:30-10 p.m.	W	209GH	Mr. Schmitz

HOME ECONOMICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Choice and Care of Clothing (4 cred.; fr.; no prereq.) (Not open to seniors)				
	Sec. 1	II	MTWTh	313HE	Ar
	2 (Open only to 1st qtr. fr.)	III	MTWTh	313HE	Ar
1w	Choice and Care of Clothing (Same as 1f) (Limited to 60)	III	MTWTh	313HE	Ar
1s	Choice and Care of Clothing (Same as 1f) (Limited to 60) (Not open to seniors)	I	MTWF	313HE	Ar
2f	Introduction to Textiles (3 cred.; all; no prereq.) (Limited to 24) (For S.L.&A., Bus. Adm., and Art. Ed.)	VI, VII	MWF	307HE	Ar
2s	Introduction to Textiles (Same as 2f) (Limited to 24)	VI, VII	MWF	307HE	Ar
3f	Clothing Construction A (3 cred.; soph.; prereq. 1) (Limited to 24)				
	Sec. 1	VI, VII, VIII	TTh	305HE	Miss Gorham
	2	VI, VII	MWF	304HE	Miss Gorham
3w	Clothing Construction A (Same as 3f) (2 sections—limited to 48)	VI, VII, VIII	TTh	305HE	Miss Gorham
3s	Clothing Construction A (Same as 3f) (Sections limited to 24 each)				
	Sec. 1	III, IV	MWF	305HE	Miss Gorham
	2	VI, VII, VIII	TTh	305HE	
4f	Clothing Construction B (3 cred.; soph., jr.; prereq. 3, 21, and home pract. in clothing construction) (2 sections—limited to 48)	III, IV	MWF	304HE	Miss Gorham
4w	Clothing Construction B (Same as 4f) (2 sections—limited to 48)	I, II	MWF	304HE	Miss Gorham
4s	Clothing Construction B (Same as 4f) (2 sections—limited to 48)	I, II	MWF	304HE	Miss Gorham
10f	Introduction to Home Economics (2 cred.; 1st qtr. fr. only; no prereq.)	IV	WF	203HE	Miss McNeal and others
15w	Personal Relationships (2 cred.; fr.; no prereq.) (Limited to 60) (Not open to seniors)	IV	MW	203HE	Miss Jeary
15s	Personal Relationships (Same as 15w) (Limited to 60)				
	Sec. 1	IV	MW	213HE	Miss Jeary
	2	VI	TTh	203HE	Miss Jeary

No.	Title	Hour	Day	Bldg.	Instructor
20f,w	Introduction to Related Art (4 cred.; fr.; no prereq.) (Limited to 60) (Not open to seniors)				
		III	MTWTh	203HE	Miss V. Goldstein
20s	Introduction to Related Art (Same as 20f,w) (Sections limited to 60 each)				
	Sec. 1	II	MTWTh	203HE	Miss Cox
	2	IV	MTWF	203HE	Miss Cox
21f	Color and Design I (3 cred.; prereq. 20) (Sections limited to 24 each)				
	Sec. 1	I, II	MWF	402HE	Mrs. Weismann
	2	I, II	TThS	402HE	Mrs. Weismann
21w	Color and Design I (Same as 21f) (Limited to 24)				
		VI, VII	MWF	402HE	Miss Cox
21s	Color and Design I (Same as 21f) (Limited to 24)				
	Sec. 1	I, II	MWF	402HE	Miss Segolson
	2	VI, VII, VIII	TTh	402HE	Miss Segolson
22f	Color and Design II (3 cred.; all; prereq. 21) (Limited to 24)				
		VI, VII	MWF	402HE	Miss Cox
22w	Color and Design II (Same as 22f) (Sections limited to 24 each)				
	Sec. 1	III, IV	MWF	402HE	Miss Cox
	2 and 3 (Limited to 48)	VI, VII, VIII	TTh	402HE	Miss Cox, Mrs. Weismann
22s	Color and Design II (Same as 22f) (Limited to 24)				
		VI, VII	MWF	112HE	Miss Cox
23w	Advanced Design (3 cred.; soph., jr.; prereq. 22) (Limited to 24)				
		I, II	TTh	401HE	Mrs. Weismann
24f	Problems in Home Planning and Furnishing (5 cred.; soph.; prereq. 20) (Limited to 24)				
		III, IV	MTWF	401HE	Miss H. Goldstein
24s	Problems in Home Planning and Furnishing (Same as 24f) (Limited to 24)				
		VI, VII, VIII	MW	401HE	Miss Segolson
		VI, VII	F		
25s	Design Applied to Crafts (3 cred.; prereq. 22) (Limited to 24)				
		III, IV	TS	110HE	Mrs. Weismann
		III	Th		
26f	Decorative Needlework and Other Crafts (3 cred.; prereq. 22) (Limited to 24)				
		VI, VII	TTh	402HE	Mrs. Weismann
30s*§	Introduction to Nutrition (2 cred.; no prereq.; not open to home econ. students)				
		VI	TTh	133Ph	Miss Biester
31f	Introduction to Nutrition (3 cred.; fr.; no prereq.) (Sections limited to 65 each) (Not open to seniors)				
	Sec. 1	I	MWF	213HE	Miss Hunt
	2	II	MWF	213HE	Miss Hunt
31w	Introduction to Nutrition (Same as 31f) (Limited to 65)				
		IV	MWF	213HE	Miss Hunt
31s	Introduction to Nutrition (Same as 31f) (Limited to 65)				
		VI	MWF	213HE	Miss Donelson
33f	Nutrition I (4 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4, Physiol. 4 or 51) (Limited to 24)				
	Lect.	III	MWF	211,213HE	
	Lab.	VI, VII, VIII	T		Miss Donelson
34f	Nutrition Problems (4 cred.; 3rd qtr. soph. jr., sr.; prereq. 31, 40, physiol. or human biol.)				
		I	TWThF	203HE	Miss Biester
40f	Food Preparation (5 cred.; prereq. 2 qtrs. chem.) (Sections limited to 20 each. Not open to freshmen)				
	Sec. 1	III, IV	MTWF	209HE	Ar
		III	Th		
	2	VI, VII	MTWThF	209HE	Ar

* Offered on the Minneapolis campus.

§ Intended for students in Science, Literature, and the Arts. Open to students in Home Economics only by special permission of chief of division.

No.	Title	Hour	Day	Bldg.	Instructor
40w	Food Preparation (Same as 40f) (Sections limited to 20 each)				
	Sec. 1	I, II	MTWThF	209HE	Ar
	2	III, IV	MTWF	209HE	Ar
		III	Th		
	3	VI, VII	MTWThF	209HE	Ar
40s	Food Preparation (Same as 40f) (Sections limited to 20 each)				
	Sec. 1	III, IV	MTWF	209HE	Ar
		III	Th		
	2	VI, VII	MTWThF	209HE	Ar
	3	I, II	MTWThF	209HE	Miss Kafka
41f,w	Food Management and Marketing (5 cred.; soph., jr., sr.; prereq. 31, 40) (Sections limited to 20 each)				
	Sec. 1	III, IV	MTWF	207HE	Miss Chambers
		V	TW		
	2	VI, VII	MWThF	208HE	Miss Chambers
		VIII	MTh		
41s	Food Management and Marketing (Same as 41f,w) (2 sections limited to 40)				
	Sec. 1	III, IV	MTWF	105HE	Miss Chambers
		V	TW	207HE	Miss Gilpin
	2	VII, VIII	MWThF	105HE	Miss Chambers
		IX	MTh	207HE	Miss Gilpin
42s	Demonstrations (1 cred.; open to 3rd qtr. jr. and sr.)				
		II, III, IV	S	107HE	Miss Chambers

Junior and Senior Courses

50f	Textiles (3 cred.; jr., sr.; prereq. 1) (2 sections—limited to 48)				
		I, II	MWF	305,307HE	Ar
50w	Textiles (Same as 50f) (2 sections—limited to 48)				
		I, II	MWF	305,307HE	Ar
50s	Textiles (Same as 50f) (Limited to 24)				
		III, IV	MWF	307HE	Miss Phelps
53f	Advanced Clothing (3 cred.; jr., sr.; prereq. 4, 22, 50) (Limited to 24)				
		I, II	MWF	304HE	Miss Carlotta Brown, Miss Gorham
53w	Advanced Clothing (Same as 53f) (Limited to 24)				
		VII, VIII	MWF	305HE	Miss Carlotta Brown, Miss Gorham
53s	Advanced Clothing (Same as 53f) (Limited to 24)				
		VII, VIII	MWF	305HE	Miss Carlotta Brown, Miss Gorham
54w	Problems in Clothing Construction (3 cred.; jr., sr.; prereq. 53 or permission of instructor)				
	(Formerly Course 52)	III, IV	MWF	304HE	Miss Gorham
55f	Related Art Problems (3 cred.; jr., sr.; prereq. 22 or 56) (Limited to 24)				
		I, II	TThS	401HE	Miss Cox
55w	Related Art Problems (Same as 55f) (Limited to 24)				
	Sec. 1	I, II	MWF	401HE	Miss V. Goldstein
	2	VI, VII	MWF	401HE	Miss H. Goldstein
55s	Related Art Problems (Same as 55f) (Limited to 24)				
		I, II	MWF	401HE	Mrs. Weismann
56Af-56Bs	Applications of Color and Design (3 cred. each; no prereq.; courses must be taken in the sequence indicated; not open to home econ. students. Written permission must be obtained from the Junior College office, 106 Folwell Hall) (Limited to 24)				
	56Af	VI, VII, VIII	TTh	401HE	Miss Cox
	56Bs	VI, VII	MWF	402HE	Miss H. Goldstein

No.	Title	Hour	Day	Bldg.	Instructor
61f,w	Quantity Cookery (4 cred.; jr., sr.; prereq. 40) (Limited to 12)				
	Lect.	I	S	313HE	Miss King
	Lab.	I, II, III	TTh	DH	Miss King
61s	Quantity Cookery (Same as 61f,s) (Sections limited to 12 each)				
	Lect.	I	S	313HE	Miss King
	Lab. Sec. 1	I, II, III	TTh	DH	
	2	VI, VII, VIII	MW	DH	
62f,w,s	Institution Experience A (3 cred.; jr., sr.; prereq. 40) (Limited to 10)				
	Lect.	IV	M	DH	Miss Dunning
	Lab.	IV, V	WF		
63f,w,s	Institution Experience B (3 cred.; jr., sr.; prereq. 61, 62) (Sections limited to 6 each) (Open only to institution management majors)				
	Lab. Sec. 1	I, II, III	MW	DH	Miss Dunning
	2	VI, VII, VIII	TTh		Miss King
64f	Institution Buying (4 cred.; jr., sr.; prereq. 61 or parallel, 62 or parallel)				
	Lect.	I	MWF	313HE	Miss King
	Lab.	VI, VII, VIII	F		
70s	Advanced Food Preparation (3 cred.; prereq. Agr. Biochem. 4, H.E. 40)				
		I, II, III	TTh	105HE	Miss Noble
75f	Dietetics Laboratory (2 cred.; jr., sr.; prereq. 34 or 170) (Limited to 20)				
		I, II	TTh	107HE	Miss Hunt
75w	Dietetics Laboratory (Same as 75f) (Limited to 20)				
		I, II	MW	107HE	Miss Donelson
76f*	Nutrition (3 cred.; not open to home econ. students; permission of instructor)				
		II	TThS	104J	Miss Donelson
79s	Selected Problems for Dietitians (3 cred.; jr., sr.; prereq. 170 or equiv.)				
		II	MWF	213HE	Ar
84f,w,s	Junior-Senior Problems (2 cred.; permission of instructor under whom student wishes to work)				
		Ar	Ar	Ar	Staff
85f,w	Home Management: Operation and Maintenance, Lectures (3 cred.; jr., sr.; prereq. 40, H.E.Ed. 90 or C.W. 40 or parallel)				
		VIII	MWF	203HE	Miss Studley
86f,w,s§	Home Management: Operation and Maintenance, Laboratory (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40) (Sections limited to 12 each)				
	Sec. 1 1st half of quarter	I and other hours	S	Home Mgt House	Miss Studley
	2 2nd half of quarter				Miss Jeary
89s*	Home Management with Special Reference to Low Income Families (3 cred.; jr., sr.; not open to students in Home Economics; open to S.L.&A., especially those preparing for social work)				
		III	MWF	125F	Miss Studley
98w	Home Economics Extension (3 cred.; sr.; prereq. H.E.Ed. 91 or parallel)				
		V	MW	213HE	Miss Newton, Miss Krost, and others
		Anyone taking this course must plan to spend 4 full days in the field.			
102f,s	Advanced Textiles (3 cred.; jr., sr.; prereq. 50, Agr. Biochem. 4, Agr. Econ. 3 or parallel) (Limited to 16)				
		VI, VII, VIII	TTh	307,311HE	Miss Phelps
107w	Textile Analysis (3 cred.; jr., sr.; prereq. 102, Agr. Biochem. 2)				
		VI, VII, VIII	MWF	311HE	Miss Phelps
115w	Clothing Economics (2 cred.; jr., sr.; prereq. 50, Agr. Econ. 3)				
		III	TTh	213HE	Ar
120f,w,s	Art History and Appreciation (3 cred.; open to Senior College and grad. students only)				
		VIII	MWF	313HE	Miss H. Goldstein, Miss V. Goldstein

* Offered on the Minneapolis campus.

§ Students who register for H.E. 86, Section 1, will take H.E. 185 the last half of the quarter, and students who register for H.E. 86, Section 2, will take H.E. 185 the first half of the quarter.

No.	Title	Hour	Day	Bldg.	Instructor
121s	Textile Design (3 cred.; jr., sr.; prereq. 50, 55, 120) (Limited to 24)				
		VI, VII, VIII	TTh	401HE	Ar
122s	Advanced Interior Design (3 cred.; jr., sr.; prereq. 180, 120 or permission of instructor) (Limited to 20)				
		I, II	TThS	401HE	Miss V. Goldstein
125w	Advanced Costume Design (3 cred.; jr., sr.; prereq. 4 or permission of instructor; 22; 26 recommended) (Limited to 20)				
		I, II	TThS	402HE	Miss Cox
142f,w	Experimental Cookery (3 cred.; jr., sr.; prereq. 40, Agr. Biochem. 4) (Limited to 12)				
		VI, VII, VIII	MW	107HE	Miss Noble
142s	Experimental Cookery (Same as 142f,w)				
		I, II, III	TTh	107HE	Miss Noble
146s	Special Food Problems (3 cred.; sr.; prereq. 142)				
		VI, VII, VIII	MW	107HE	Miss Noble
147s	Special Food Problems (5 cred.; sr.; prereq. 142)				
		VI, VII, VIII 4 hrs. ar.	MW	107HE	Miss Noble
163s	Institution Management Problems (3 cred.; sr.; prereq. 61, 62, 64 or parallel)				
	Lect.	III	TTh	313HE	Miss Dunning
	Lab.	III, IV	S	DH	
170f	Nutrition of the Family (3 cred.; jr., sr.; prereq. 31, 40, Agr. Biochem. 4, Physiol. 3 cred.) (Limited to 40)				
		II	MWF	106HE	Miss Leichsenring
170w	Nutrition of the Family (Same as 170f) (Limited to 40)				
		I	MWF	313HE	Miss Hunt
171w,s	Child Nutrition (3 cred.; jr., sr.; prereq. 170, H.E.Ed. 90 or C.W. 40) (Limited to 30)				
	Lect.	III	MW	307HE(w)	Miss Leichsenring
		III*	F	213HE(s)	
	Lab.	IV	Ar before completing registration		Miss Donelson
173s	Nutrition in Disease (3 cred.; jr., sr.; prereq. 170, 175 also advised)				
		I	MWF	213HE	Miss Hunt
175w	Nutrition II (4 cred.; jr., sr.; prereq. 33) (Each lab. section limited to 24)				
	Lect.	III	MWF	211HE	Miss Donelson
	Lab.	VI, VII, VIII	T	213HE	
176w	Advanced Nutrition (4 cred.; jr., sr.; prereq. 33, 175 or parallel, Agr. Biochem. 2) (Limited to 12)				
		II, III, IV	TS	307HE	Miss Biester
		II, III	Th	311HE	
177s	Digestion and Metabolism (3 cred.; jr., sr.; prereq. 175) (Limited to 15)				
		VI, VII, VIII	TTh	313HE	Miss Leichsenring
178f,w,s	Clinical Problems in Nutrition (2 cred.; jr., sr.; prereq. 75 or parallel, 170, 175 or parallel) (Limited to 8) (See instructor before completing registration)				
	Lect.	V	T	313HE	Miss Hunt,
	Lab.	V, VI, VII, VIII	Th	Ar	Miss Donelson
179f	Readings in Nutrition (2 cred.; jr., sr.; prereq. 170) (Limited to 15)				
		III	TTh	213HE	Miss Leichsenring
179w,s	Readings in Nutrition (Same as 179f) (Limited to 15)				
		I	TTh	213HE	Miss Hunt, Miss Donelson
180w	Home Planning and Furnishing (5 cred.; jr., sr.; prereq. 55; 120 recommended) (Limited to 24)				
		III, IV	MTWF	401HE	Miss H. Goldstein

* Offered on the Minneapolis campus.

No.	Title	Hour	Day	Bldg.	Instructor
180s	Home Planning and Furnishing (Same as 180w) (2 sections limited to 48)	III, IV	MTWF	401, 402HE	Miss V. Goldstein
185f,w§	Family Relationships (2 cred.; jr., sr.; prereq. 86 or parallel, H.E.Ed. 90 or C.W. 40)	VII and 1 hr. ar.	MWF	213HE	Miss Studley
185s	Family Relationships (Same as 185f,w)	VI and 1 hr. ar.	MWF	203HE	
186s	Problems in Income Management (3 cred.; prereq. 85 or parallel, 86, 170 or equiv., Agr. Econ. 126 or parallel)	VII	MWF	203HE	Miss Studley

HORTICULTURE

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
6f	Fruit Growing (3 cred.; no prereq.)	II	MWF	102Hr	Mr. Brierley
10s	Home Floriculture (3 cred.; no prereq.; not open to students with credit in Hort. 11 or 56)	III 1 extra lab. hr. ar.	MWF	8Hr	Mr. Longley
11s	Garden Flowers (3 cred. [2 cred. if Course 10 has been taken]; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years)	VI, VII, VIII	TTh	8Hr	Mr. Longley
12f	Commercial Floriculture, Fall Crops (3 cred.; prereq. Bot. 1 or equiv.)	VI, VII, VIII	T	8Hr	Mr. Longley
		VI, VII	Th		Mr. Sando
14s	Commercial Floriculture, Spring Crops (3 cred.; prereq. Bot. 1 or equiv.) (Offered only in even numbered years)	VI, VII, VIII	T	8Hr	Mr. Longley
		VI, VII	Th		Mr. Sando
21f	Plant Materials, Fall and Winter Aspects (3 cred.; prereq. Bot. 10 cred. or equiv.)	VI, VII, VIII	MW	8aHr	Mr. Longley
22s	Plant Materials, Spring and Summer Aspects (3 cred.; prereq. Bot. 10 cred. or equiv.)	VI, VII, VIII	MW	8aHr	Mr. Longley
24w	Principles of Landscape Design (3 cred.; prereq. 21 or 22, Draw. and Des. Geom. 41 or Agr. Eng. 3)	VI, VII, VIII	MW	107Hr	Mr. Longley
32s	Vegetable Growing (3 cred.; no prereq.) Lect.	II	MWF	102Hr	Mr. Krantz, Mr. Hutchins
41f	Judging Horticultural Crops (2 cred.; soph., jr., sr.; prereq. 6 or 32) (Offered only in even numbered years)	VI, VII, VIII	T	8Hr	Mr. Currence, Mr. Brierley, Mr. Sando

Junior and Senior Courses

No.	Title	Hour	Day	Bldg.	Instructor
56w	Plant Propagation (3 cred.; [2 cred. if Course 10 has been taken]; jr., sr.; prereq. Bot. 7 cred. or equiv.) (Offered only in even numbered years)	VI, VII, VIII	T	8Hr	Mr. Longley
		VI, VII	Th		Mr. Sando
107f	Orchard Management (3 cred.; jr., sr.; prereq. 6) (Offered only in even numbered years)	III	TTh	106Hr	Mr. Brierley
		VI, VII	Th		
110w	Horticultural Crop Breeding (3 cred.; jr., sr.; prereq. Agron. 31)	III	TThS	106Hr	Mr. Wilcox

§ Students who register for H.E. 185, Section 1, will take H.E. 86 the last half of the quarter, and students who register for H.E. 185, Section 2, will take H.E. 86 the first half of the quarter.

No.	Title	Hour	Day	Bldg.	Instructor
111f	Systematic Pomology (3 cred.; jr., sr.; prereq. 6, Bot. 10 cred. or equiv.) (Offered only in odd numbered years)	VI, VII, VIII	TTh	106Hr	Mr. Brierley
121w	Small Fruit Culture (3 cred.; jr., sr.; prereq. 6 or 32, Bot. 10 cred. or equiv.)	II	MWF	106Hr	Mr. Brierley
135f	Potatoes (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)	Ar	Ar	Ar	Mr. Krantz
137w	Vegetable Crops (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)	Ar	Ar	Ar	Mr. Currence
153w	Conservatory Plants and Florists' Flowers (3 cred.; jr., sr.; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years)	VI, VII, VIII	T	8aHr	Mr. Longley
		VI, VII	Th		Mr. Sando
176s	Landscape Construction (3 cred.; sr.; prereq. 74) (Offered only in odd numbered years)	VI, VII, VIII, IX	F	107Hr	Mr. Longley
		1 hr. lect. ar.			
190f-191w-192s	Special Problems (2 to 4 cred. per qtr.; jr., sr.; prereq. instructor's permission)	Ar	Ar	Ar	Mr. Alderman and staff
193f-194w	Horticultural Seminar (1 cred. per qtr.; sr.; prereq. Hort. 9 cred.)	IX	W	106Hr	Horticultural staff

PLANT PATHOLOGY AND BOTANY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Plant Pathology (5 cred.; soph., jr., sr.; prereq. 10 cred. in plant sciences of which at least 7 shall be in botany. Not open to students who have taken Course 10)	VII, VIII, IX	MWF	106,107PP	Mr. Stakman, Mr. Tervet
1s	Plant Pathology (See 1f)	VII, VIII, IX	MWF	106,107PP	Mr. Tervet
7w	Grasses and Sedges (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)	III	TThS	206OD	Mr. Larson
		IV	TS	206OD	
8s	Weeds (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.) (Each section limited to 40 students)				
	Sec. 1 Lect.	III	TTh	204OD	Mr. Larson
	Lab.	III, IV	S	206OD	
	Rec. and quiz	IV	T	204OD	
	2 Lect.	III	ThS	204OD	
	Lab.	III, IV	T	206OD	
	Rec. and quiz	IV	S	204OD	
9f	Weeds and Seed Testing (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)	VI, VII, VIII	TTh	206OD	Mr. Larson
10w	Forest Pathology (5 cred.; soph., jr., sr.; prereq. Bot. 9 cred. Not open to those who have completed Course 1)	VII, VIII, IX	MWF	106,107PP	Mr. C. Christensen
10s	Forest Pathology (Same as 10w)	I	MWF	107PP	Mr. C. Christensen
		I, II	TThS	106, 107PP	

Junior and Senior Courses

51f,w,s	Special Problems in Forest Pathology (2 to 5 cred.; jr., sr.; prereq. 10)	Ar	Ar	Ar	Mr. C. Christensen

No.	Title	Hour	Day	Bldg.	Instructor
52w	Seed Problems (3 cred.; jr., sr.; prereq. 9)	Ar	Ar	Ar	Mr. Larson
53s	Food Plants of Game Animals (3 cred.; jr., sr.; prereq. one yr. of botany and one yr. of Zool. or equiv.)	IV	MWF	206OD	Mr. Larson
105f-106w-107s	Mycology (3 or 5 cred. per qtr.; jr., sr.; prereq. 1 or 10 or equiv.)	Ar	Ar	302PP	Miss Dosdall
110w	Principles of Pathology (3 cred.; jr., sr.; prereq. 1 or 10, Bact. 41)	III, IV	MWF	400,104PP	Mr. Stakman, Mr. Eide
111w	Diseases of Field Crops (3 cred.; jr., sr.; prereq. 1 or 10)	VI, VII	MWF	106,107PP	Mr. J. J. Christensen
112s	Diseases of Fruit and Vegetable Crops (3 cred.; jr., sr.; prereq. 1 or 10) (Not offered in 1939-40)	III, IV	MWF	107,104PP	Mr. Eide
114w	Advanced Forest Pathology (3 cred.; jr., sr.; prereq. 1 or 10)	Ar	Ar	104PP	Mr. Stakman, Mr. C. Christensen
118f	Bacterial Diseases of Plants (3 cred.; jr., sr.; prereq. 1 or 10) (Not offered in 1939-40)	Ar	Ar	107,104PP	Mr. Eide
119s	Principles of Plant Disease Control (3 cred.; jr., sr.; prereq. 1 or 10)	VI, VII, VIII	TTh	107,104PP	Mr. Eide, Mr. Moore
141f-142w	Insects in Relation to Plant Disease (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)	III, IV	TS	302Ad	Mr. J. J. Christensen,
		III	Th		Mr. Granovsky
143f	Methods (3 cred.; jr., sr.; prereq. 1 or 10)	Ar	Ar	104PP	Miss Hart, Mr. Moore
160f or w	Plant Histochemistry (3 cred.; sr.; prereq. bot. and elem. chem.)	Ar	Ar	Ar	Mr. Landon
161f	Transport, Storage, and Ripening of Fruits and Vegetables (3 cred.; sr.; prereq. Plant Physiol. 3 cred.)	Ar	Ar	Ar	Mr. Harvey
162w	Physiological Relations of Crop Plants to Temperature (3 cred.; sr.)	Ar	Ar	206PP	Mr. Harvey
163s	Applied Plant Physiology (3 cred.; jr., sr.; prereq. Plant Physiol. 3 cred., Chem. 5 cred.)	Ar	Ar	206PP	Mr. Landon

PUBLICATIONS AND RURAL JOURNALISM

No.	Title	Hour	Day	Bldg.	Instructor
50f-51w-52s	Agricultural Journalism (9 cred.; jr., sr.; prereq. Journ. 13-14-15, 51-52 and permission of instructor)	VI	MWF	Ar	
53w	Publicity (3 cred.; jr., sr.; prereq. Rhet. 1, 2, 3)	I	TThS	Ar	

For additional courses see under Journalism, College of Science, Literature, and the Arts, page 61.

RHETORIC

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Rhetoric I (3 cred.; no prereq.) (Sections limited to 35 each)				
	Sec. 1	II	MWF	216En	Mr. Randel
	2	III	TThS	308En	Miss Thurston
	3	I	TThS	312En	Mr. Randel
	4	I	MWF	310En	Mr. Brown
	5	IV	MWF	312En	Mr. Lansing
	6	III	MWF	308En	Miss Thurston
1w	Rhetoric I (Same as 1f) (Limited to 35)				
		I	MWF	310En	Mr. Brown
1s	Rhetoric I (Same as 1f)				
		II	TThS	306En	Mr. Randel
2f	Rhetoric II (3 cred.; prereq. 1 or exemption on basis of placement test) (Sections limited to 35 each)				
	Sec. 1	II	MWF	308En	Miss Thurston
	2	III	MWF	105En	Mr. Randel
	3	II	TThS	307En	Mr. Lansing
2w	Rhetoric II (Same as 2f) (Sections limited to 35 each)				
	Sec. 1	II	MWF	310En	Mr. Brown
	2	II	TThS	310En	Mr. Brown
	3	III	MWF	310En	Mr. Randel
	4	I	MWF	307En	Mr. Randel
	5	II	MWF	216En	Mr. Randel
	6	III	MWF	308En	Miss Thurston
2s	Rhetoric II (Same as 2f) (Limited to 35)				
		IV	MWF	310En	Mr. Brown
3f	Rhetoric III (3 cred.; prereq. 2) (Limited to 35)				
		IV	MWF	310En	Mr. Brown
3w	Rhetoric III (Same as 3f) (Sections limited to 35 each)				
	Sec. 1	III	TThS	216En	Mr. Nichols
	2	III	MWF	100HH	Mr. Nichols
	3	IV	MWF	308En	Miss Thurston
	4	II	TThS	216En	Mr. Randel
3s	Rhetoric III (Same as 3f) (Sections limited to 35 each)				
	Sec. 1	II	MWF	310En	Mr. Brown
	2	III	MWF	306En	Mr. Randel
	3	I	TThS	307En	Mr. Lansing
	4	I	MWF	312En	Mr. Nichols
	5	III	TThS	306En	Mr. Randel
	6	IV	MWF	306En	Mr. Randel
	7	II	TThS	312En	Mr. Lansing
11f	Argumentation (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended) (Limited to 20)				
	Sec. 1	II	MWF	307En	Mr. Lansing
	2	III	TThS	109HH	Mr. Nichols
11w	Argumentation (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended)				
		III	TThS	100HH	Mr. Nichols
11s	Argumentation (Same as 11f) (Limited to 30)				
		II	MWF	307En	Mr. Lansing
22f§	Public Speaking (3 cred.; soph., jr.; prereq. 3) (Sections limited to 20 each)				
	Sec. 1	IV	MWF	311En	Mr. Routledge
	2	III	MWF	311En	Mr. Routledge
	3	I	TThS	311En	Mr. Nichols
	4	III	MWF	103En	Mr. Nichols
	5	II	TThS	311En	Mr. Routledge
	6	I	MWF	311En	Mr. Nichols
	7	II	MWF	310En	Mr. Nichols

§ Students may not receive credit for both Rhetoric 22 and 23.

No.	Title	Hour	Day	Bldg.	Instructor
22w§	Public Speaking (Same as 22f) (Sections limited to 20 each)				
	Sec. 1	IV	MWF	311En	Mr. Routledge
	2	II	MWF	311HH	Mr. Nichols
	3	III	MWF	311En	Mr. Routledge
	4	III	TThS	311En	Mr. Routledge
	5	II	TThS	311En	Mr. Routledge
	6	I	MWF	311En	Mr. Nichols
	7	I	TThS	307En	Mr. Nichols
22s§	Public Speaking (Same as 22f) (Sections limited to 20 each)				
	Sec. 1	III	MWF	311En	Mr. Routledge
	2	II	TThS	307En	Mr. Nichols
	3	III	TThS	307En	Mr. Nichols
	4	II	MWF	312En	Mr. Nichols
23s§	Public Speaking (5 cred.; soph., jr., sr.; prereq. 3) (Limited to 20)				
		IV	MTWFS	311En	Mr. Routledge
24s	Advanced Public Speaking (3 cred.; soph., jr., sr.; prereq. 22) (Limited to 20)				
		II	MWF	311En	Mr. Routledge
28f	Play Production (3 cred.; soph., jr., sr.; prereq. 3)				
		III	TThS	311En	Mr. Routledge
31f	Survey of English Literature I (5 cred.; soph., jr., sr.; prereq. 3 or permission of instructor) (Limited to 40)				
		III	MTWThF	307En	Mr. Lansing
31w	Survey of English Literature I (Same as 31f) (Limited to 40)				
		II	MTWThF	308En	Miss Thurston
31s	Survey of English Literature I (Same as 31f) (Limited to 40)				
		III	MTWThF	308En	Miss Thurston
32f	Survey of English Literature II (3 cred.; soph., jr., sr.; prereq. 3) (Limited to 40)				
		III	TThS	310En	Mr. Brown
32s	Survey of English Literature II (Same as 32f) (Limited to 40)				
		III	TThS	310En	Mr. Brown
33f,s	American Life and Literature (3 cred.; soph., jr., sr.; prereq. 3)				
		IV	MWF	308En(fall)	Mr. Randel
		I	TThS	306En(spring)	Mr. Randel
34f,w,s	Books and Reading (1 cred.; no prereq.) (Sections limited to 50 each)				
		II	F	103En(fall)	Mr. Brown
		IV	F	103En(winter)	
	Sec. 1	I	F	307En(spring)	
	2	III	W	307En(spring)	

Junior and Senior Courses

51f	Exposition (3 cred.; jr., sr.; prereq. 3) (Limited to 35)				
		II	TThS	308En	Miss Thurston
51w	Exposition (Same as 51f)				
	Sec. 1	II	TThS	307En	Mr. Lansing
	2	III	MWF	301Ad	Mr. Lansing
	3	III	TThS	308En	Miss Thurston
51s	Exposition (Same as 51f)				
	Sec. 1	II	TThS	308En	Miss Thurston
	2	IV	MWF	308En	Miss Thurston
59s	Advanced Play Production (3 cred.; jr., sr.; prereq. 28 or permission of instructor)				
		III	TThS	311En	Mr. Routledge
60w,s	Contemporary Literature (3 cred.; jr., sr.; prereq. 3)				
		IV	MWF	105En	Mr. Lansing

§ Students may not receive credit for both Rhetoric 22 and 23.

SOILS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
6w	Soils (5 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4)				
		II	MTWThF	107En	Mr. Rost

Junior and Senior Courses

50s	Forest Soils (2 cred.; jr. in forestry; prereq. Agr. Biochem. 4)				
		Given at Cloquet			Mr. McMiller
101f	Chemical Analysis of Soils (3 to 5 cred.; jr., sr.; prereq. 6, quant. anal.)				
	Lect.	IV	T	204So	Mr. Rost
	Lab.	Ar	Ar	Ar	
103s	Soil Erosion (3 cred.; jr., sr.; prereq. 6)				
		II	TThS	204So	Mr. Rost
104s	Soil Mapping (3 cred.; jr., sr.; prereq. 108)				
		Ar	Ar	204So	Mr. McMiller
107f	Fertilizers (3 cred.; jr., sr.; prereq. 6)				
		II	TThS	204So	Mr. Rost
108w	Physical Properties of Soils (3 cred.; jr., sr.; prereq. 6 or 50)				
	Lect.	VI	W	204So	Mr. McMiller
	Lab.	VII, VIII, IX	W	201So	Mr. McMiller
		VI, VII, VIII	F	201So	

VETERINARY MEDICINE

Junior and Senior Courses

No.	Title	Hour	Day	Bldg.	Instructor
50f-51w-52s†	Anatomy, Physiology, and Hygiene of Domestic Animals (9 cred.; jr., sr.)				
		I	TThS	102Ve	Mr. Fitch, Mr. Boyd, Mr. Kernkamp

† Course must be taken in sequence 50-51-52 but entire sequence need not be completed in order to receive credit.

SCHOOL OF BUSINESS ADMINISTRATION

ECONOMICS

Junior College advisers.—Mr. Borak, Mr. Langum, Mr. Lund, Mr. Nordin, Mr. Simpson, Mr. Stoltz, Mr. Tow, Mrs. Youngs.

Major advisers in the College of Science, Literature, and the Arts.—Mr. Garver, Mr. Marget, Mr. Myers.

Major sequence in the College of Science, Literature, and the Arts.—A student majoring in Economics is required to earn at least 33 credits in Senior College courses as follows: (1) required courses: Economics 103-104, 141, 161; (2) at least 6 credits from Economics 105, 106, 149, 176, 191-192; (3) at least 6 credits from Economics 154, 160, 172, 185; and (4) 9 additional credits from any Senior College economics courses listed in this bulletin. Students who expect to take postgraduate work in business or economics in this or another university are advised to include in their program the following courses: Economics 5 and 113-114 in statistics; and Economics 25-26 in accounting.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

(Prerequisites: Economics 3 and 6-7. In addition the student is urged to earn at least 9 credits in History, Political Science, or Sociology.)

Honors Course.—Students whose records show that they are capable of doing better than average work, and who wish to study for graduation honors or to pursue a special interest should consult a major adviser for modification of the sequential requirements.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Introduction to Economics (5 cred.; fr. only; no prereq.)				
	Lect.	III	TTh	BuAud	Mr. Filipetti,
	Sec. 1	I	MWF	113VH	Mr. Heaton,
	2	I	TThS	221VH	and others
	3	I	TThS	211VH	
	4	II	MWF	221VH	
	5	II	TThS	211VH	
	6	III	MWF	205VH	
	7	III	MWF	6VH	
	8	IV	MWF	112Bu	
	9	IV	MWF	210P	
	10	V	MWF	210VH	
	11	V	MWF	113VH	
	12	VI	MWF	113VH	
	13	VI	MWF	105VH	
	14	VII	MWF	1VH	
	15	VII	MWF	4VH	
1w	Introduction to Economics (See 1f)				
	Lect.	III	TTh	166Ph	Mr. Filipetti,
	Sec. 1	I	TThS	205VH	Mr. Heaton,
	2	IV	MWF	4VH	and others
	3	VII	MWF	1VH	
1s	Introduction to Economics (See 1f)				
		IV	MTWFS	211VH	

No.	Title	Hour	Day	Bldg.	Instructor
3f	Elements of Money and Banking (5 cred.; 2nd and 3rd qtr. fr., soph.; no prereq.)				
	Lect.	II	TTh	JAud	Mr. Stehman
	Sec. 1	I	TThS	205VH	and others
	2	II	MWF	211VH	
	3	III	MWF	2VH	
	4	III	TThS	221VH	
	5	V	MWF	2VH	
	6	VII	MWF	113VH	
3w	Elements of Money and Banking (See 3f)				
	Lect.	III	TTh	BuAud	Mr. Stehman
	Sec. 1	I	MWF	211VH	and others
	2	I	MWF	1VH	
	3	I	TThS	210VH	
	4	II	MWF	307VH	
	5	II	TThS	307VH	
	6	II	TThS	211VH	
	7	III	MWF	113VH	
	8	III	MWF	208P	
	9	IV	MWF	105VH	
	10	IV	MWF	301VH	
	11	V	MWF	221VH	
	12	V	MWF	211VH	
	13	VI	MWF	210VH	
	14	VI	MWF	307VH	
	15	VII	MWF	4VH	
3s	Elements of Money and Banking (See 3f)				
	Lect.	IV	MW	150Ph	Mr. Stehman
	Sec. 1	I	MWF	2VH	and others
	2	III	MWF	211VH	
	3	III	TThS	205VH	
	4	V	MWF	112VH	
	5	VI	MWF	307VH	
	6	VII	MWF	205VH	
5f*	Elements of Statistics (5 cred.; 3rd qtr. fr., soph.; no prereq.)				
	Lect.	III	M	JAud	Mr. Kozelka
	Sec. 1	I	MWThF	301VH	and others
	2	IV	MTWF	205VH	
	3	V	MTWF	205VH	
	4	VI	MWThF	210VH	
5w*	Elements of Statistics (See 5f)				
	Lect.	III	M	JAud	Mr. Kozelka
	Sec. 1	I	MWThF	221VH	and others
	2	IV	MTWF	1VH	
	3	VI	MWThF	113VH	
5s*	Elements of Statistics (See 5f)				
	Lect.	III	T	BuAud	Mr. Kozelka
	Sec. 1	I	MWThF	115VH	and others
	2	I	MWThF	211VH	
	3	II	MWThF	113VH	
	4	II	MWThF	211VH	
	5	II	MWThF	221VH	
	6	III	MWThF	115VH	
	7	III	MWThF	112VH	
	8	III	MWThF	113VH	
	9	IV	MTWF	6VH	
	10	IV	MTWF	113VH	
	11	V	MTWF	211VH	
	12	V	MTWF	115VH	
	13	VI	MWThF	210VH	
	14	VI	MWThF	2VH	
	15	VI	MWThF	112VH	
	16	VII	MWThF	115VH	

* Not open to students who have received credit in Soc. 45 or B. A. 70.

No.	Title	Hour	Day	Bldg.	Instructor
6f-7w†§	Principles of Economics (10 cred.; soph., jr., sr.; no prereq.)				
	Lect.	II	F	BuAud	Mr. Marget
	Sec. 1	I	MWThF	115VH	and others
	2	I	MWThF	112VH	
	3	II	MTWTh	113VH	
	4	II	MTWTh	112VH	
	5	III	MWThF	115VH	
	6	III	MWThF	112VH	
	7	IV	MTWF	115VH	
	8	IV	MTWF	221VH	
	9	V	MTWF	115VH	
	10	V	MTWF	112VH	
	11	VI	MWThF	115VH	
	12	VI	MWThF	112VH	
	13 (fall only)	VI	MWThF	211VH	
	14	VII	MWThF	2VH	
	15	VII	MWThF	112VH	
6w-7s†	Principles of Economics (See 6f-7w)				
	Lect.	IV	T	150Ph	Mr. Marget
	Sec. 1	I	MWThF	113VH	and others
	2	II	MWThF	115VH	
	3	III	MWThF	2VH	
	4 (winter only)	IV	MWFS	210VH	
	5	V	MTWF	113VH	
	6	VI	MWThF	211VH	
	7	VII	MWThF	113VH	
6s†	Principles of Economics (1st qtr. of 6-7. See 6f-7w)				
	Lect.	II	F	4VH	Mr. Marget
	Sec. 1	II	MTWTh	112VH	and others
	2	VII	MWThF	112VH	
7f†	Principles of Economics (2nd qtr. of 6-7. See 6f-7w)				
	Lect.	IV	T	1VH	Mr. Marget
	Sec. 1	II	MWThF	115VH	and others
	2	VII	MWThF	115VH	
8f-9w	General Economics (6 cred.; soph., jr., sr.; no prereq. Open to Institute of Technology students only)				
	Sec. 1	I	MWF	2VH	Mr. Filipetti
	2 (fall only)	I	MWF	211VH	and others
	3	II	MWF	210VH	
	4	III	MWF	211VH	
	5	IV	MWF	211VH	
8w-9s	General Economics (See 8f-9w)				
		III	TThS	210VH	Mr. Filipetti and others
10f	An Introduction to Economic Analysis (3 cred.; no prereq. Open to College of Pharmacy students only)				
		I	MWF	202Phm	Mr. Borak
20f¶	Elements of Accounting (3 cred.; 3rd qtr. fr., soph.; no prereq.)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	I	MWF	307VH	and others
	3	I	TThS	307VH	
	4	II	MWF	307VH	
	5	II	MWF	301VH	
	6	II	TThS	301VH	
	7	III	MWF	210VH	
	8	III	TThS	301VH	

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

§ The final examination in this course will conflict with that of any course having lectures the same hour on MW. Therefore, students must not register for two such courses.

¶ Students who have had high school training or other experience in bookkeeping and who pass a placement test may be exempt from this course and admitted to Econ. 25. This placement test will be given on the first day of each quarter. For further information consult the office of the dean of the School of Business Administration.

No.	Title	Hour	Day	Bldg.	Instructor
20f§	Elements of Accounting—*Continued*				
	9	IV	MWF	307VH	
	10	IV	MWF	301VH	
	11	V	MWF	221VH	
	12	VI	MWF	221VH	
	13	VI	MWF	205VH	
	14	VII	MWF	221VH	
20w§	Elements of Accounting (See 20f)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	II	MWF	221VH	and others
	3	III	MWF	205VH	
	4	III	TThS	221VH	
	5	V	MWF	205VH	
	6	VII	MWF	207VH	
20s§	Elements of Accounting (See 20f)				
	Sec. 1	I	MWF	221VH	Mr. Heilman
	2	I	TThS	221VH	and others
	3	II	MWF	210VH	
	4	III	MWF	205VH	
	5	III	TThS	221VH	
	6	IV	MWF	301VH	
	7	VI	MWF	221VH	
	8	VII	MWF	307VH	
25f-26w	Principles of Accounting (6 cred.; soph., jr., sr.; prereq. Econ. 20)				
	Sec. 1	III	MWF	307VH	Mr. Heilman
	2	III	TThS	205VH	and others
	3	V	MWF	307VH	
	4	VII	MWF	211VH	
25w-26s	Principles of Accounting (See 25f-26w)				
	Sec. 1	I	MWF	301VH	Mr. Heilman
	2	I	TThS	301VH	and others
	3	II	MWF	301VH	
	4	II	TThS	301VH	
	5	III	MWF	301VH	
	6	III	TThS	301VH	
	7 (winter only)	IV	MWF	307VH	
	8	VI	MWF	205VH	
	9 (winter only)	VII	MWF	307VH	
25s	Principles of Accounting (1st qtr. of 25-26. See 25f-26w)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	II	TThS	210VH	and others
	3	III	MWF	307VH	
	4	IV	MWF	307VH	
26f	Principles of Accounting (2nd qtr. of 25-26. See 25f-26w)				
	Sec. 1	II	TThS	307VH	Mr. Heilman
	2	III	MWF	301VH	and others
	3	VII	MWF	307VH	
27s	Accounting Survey (5 cred.; no prereq.; open to pre-legal students only)				
	Sec. 1	IV	MTWFS	221VH	Mr. Miller
	2	VI	MTWThF	115VH	Mr. Miller
28f	Business Law (3 cred.; soph., jr., sr. with 6 cred. in econ. or sr. without econ. cred. Open to Institute of Technology and College of Agriculture students only)				
		I	MWF	135E	Mr. Palmer
28s	Business Law (See 28f)				
		I	MWF	335EE	Mr. Palmer
29f	Principles of Accounting (3 cred.; soph., jr., sr.; no prereq. Open to Institute of Technology students only)				
	Sec. 1	I	MWF	205VH	Mr. Lund
	2	IV	MWF	112VH	Mr. Nelson

§ Students who have had high school training or other experience in bookkeeping and who pass a placement test may be exempt from this course and admitted to Econ. 25. This placement test will be given on the first day of each quarter. For further information consult the office of the dean of the School of Business Administration.

No.	Title	Hour	Day	Bldg.	Instructor
29s	Principles of Accounting (See 29f)				
		I	MWF	307VH	Mr. Lund
30w	Elements of Retail Accounting (3 cred.; prereq. Econ. 10. Open to College of Pharmacy students only)				
		II	MWF	211VH	Mr. Ostlund
32f-33w*†‡¶	Secretarial Training: Typewriting (2 cred.; 2nd qtr. of fr., soph., jr.; prereq. consent of instructor)				
	Sec. 1	IV	MTWFS	209VH	Miss Lohren
	2 (pre-secretarial and pre-commercial education students only)	VII	MTWThF	209VH	Miss Lohren
32w-33s*†‡¶	Secretarial Training: Typewriting (See 32f-33w)				
	(winter)	V	MTWThF	209VH	Miss Lohren
	(spring)	VIII	MTWThF	209VH	Miss Lohren
34f‡¶	Secretarial Training: Advanced Typewriting (1 cred.; soph., jr.; prereq. consent of instructor)				
		V	MTWThF	209VH	Miss Lohren
34s‡¶	Secretarial Training: Advanced Typewriting (See 34f)				
		VII	MTWThF	209VH	Miss Lohren
35s	Office Practice for Dental Hygienists (3 cred.; jr., sr.; prereq. Econ. 32-33 or equiv.; open to dental hygienists only)				
	Sec. 1	IV	MWF	209VH	Miss Kean
	2	V	MWF	209VH	Miss Kean
37f-38w-39s†‡¶**	Secretarial Training: Shorthand (9 cred.; soph., jr.; prereq. Econ. 33 or consent of instructor)				
	Secretarial students	II	MTWThF	209VH	Miss Donaldson
	Commercial education students	III	MTWThF	209VH	and others
40f-41w-42s†‡¶**	Secretarial Procedure (9 cred.; soph., jr., sr.; prereq. Econ. 34 and 39 or consent of instructor)				
	Secretarial students	I	MTWThF	209VH	Miss Kean
	Commercial education students	VI	MTWThF	209VH	Miss Kean(f,w), Miss Donaldson(s)

Senior College Courses

82f§‖	Competition and Monopoly in Modern Industry (3 cred.; jr., sr.; no prereq.)				
		II	TThS	205VH	Mr. Vaile
83w§‖	The Inequality of Incomes (3 cred.; jr., sr.; prereq. Econ. 82)				
		II	TThS	205VH	Mr. Borak
84s	Comparative Economic Systems (3 cred.; jr., sr.; prereq. Econ. 6-7 or 83)				
		I	TThS	205VH	Mr. Upgren
97f,98w,99s	Honors Course in Economics (Cred. ar.; jr., sr.; prereq. consent of major advisers)				
		Ar	Ar	Ar	Ar
103f-104w†§§	Advanced Economics: Competition, Monopoly, and Inequality of Incomes (6 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. including Econ. 6-7 or 83)				
		II	TThS	210VH	Mr. Garver
105s	History of Economic Ideas: The Classical Economists (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104 or consent of instructor)				
		VII	MWF	207VH	Mr. Garver
106	*History of Economic Ideas: The Critics of the Classical Economists* (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104 or consent of instructor) *(Not offered)*				

* Students who have had one year of high school typewriting are admitted to Economics 33.

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

‡ A fee of $2.50 a quarter is charged students registering for one or more of these courses.

§ Not open to students who have received credit for Econ. 6-7.

¶ This course carries credit only if required in the student's major sequence.

‖ This course may not be included as a part of the Senior College work required for a minor in economics in the College of Science, Literature, and the Arts.

** Students who have had one year of high school shorthand are admitted to Econ. 38; those who have had two years of high school shorthand are admitted to Econ. 40.

§§ Not open to School of Business Administration students.

No.	Title	Hour	Day	Bldg.	Instructor
108s	Applications of Economic Theory (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104)	VI	MWF	113VH	Mr. Stigler
110s	Industrial Price Control (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83 and 15 additional credits in economics and/or business administration. Econ. 160 or B. A. 155 is a desirable preceding course)	I	TThS	210VH	Mr. Garver
113w-114s†	Theory of Statistics (6 cred.; jr., sr., grad.; prereq. Econ. 5)	I	MWF	205VH	Mr. Mudgett
115w	Probability and Statistics (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	IV	MWF	112VH	Mr. Altschul
117w	Modern European Economic Problems (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	VII	MWF	205VH	Mr. Altschul
124w	Comparative Banking: British Systems (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B. A. 142)	III	MWF	210VH	Mr. Myers
125	*Comparative Banking: European Systems* (3 cred., jr., sr., grad.; prereq. Econ. 141 or B. A. 142) *(Not offered)*				
127s	Comparative Banking: South American Systems (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B. A. 142)	II	MWF	205VH	Mr. Myers
128s	Business Cycle Theory in European Literature (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	IV	MWF	112VH	Mr. Altschul
131f	Introduction to Mathematical Analysis in Economics (3 cred.; sr., grad.; prereq. Econ. 6-7 or 83)	III	TThS	210VH	Mr. Altschul
140	*The Co-operative Movement* (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83) *(Not offered)*				
141f¶	Monetary and Banking Policy (3 cred.; jr., sr., grad.; prereq. Econ. 3, and either Econ. 6-7 or 83)	I	TThS	210VH	Mr. Myers
144f	Cartels and Trusts (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	VII	MWF	205VH	Mr. Altschul
149f	Business Cycles (3 cred.; sr., grad.; prereq. Econ. 141 or B. A. 142 or consent of instructor)	III	TThS	1VH	Mr. Marget
149w	Business Cycles (See 149f)				
	Sec. 1	I	MWF	105VH	Mr. Marget
	2	VI	MWF	6VH	Ar
149s	Business Cycles (See 149f)				
	Sec. 1	II	TThS	6VH	Mr. Marget
	2	VI	MWF	105VH	Mr. Marget
154s¶	Public Utilities (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. incl. Econ. 6-7 or 83)	II	TThS	105VH	Mr. Garver
160w¶	The Modern Corporation (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either 6-7 or 83)	IV	MWF	205VH	Mr. Stehman
161f	Labor Problems and Trade Unionism (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)				
	Sec. 1	III	MWF	4VH	Ar
	2	IV	MWF	4VH	Mr. Yoder
161w	Labor Problems and Trade Unionism (See 161f)				
	Sec. 1	I	TThS	207VH	Mr. Schmidt
	2	II	MWF	4VH	Mr. Yoder
161s	Labor Problems and Trade Unionism (See 161f)				
	Sec. 1	I	TThS	207VH	Mr. Yoder
	2	IV	MWF	1VH	Mr. Yoder
162w	Labor and Socialist Movements (3 cred.; jr., sr., grad.; prereq. Econ. 161)	VI	MWF	221VH	Mr. Schmidt
163	*Economic Aspects of Population and Immigration* (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83) *(Not offered)*				

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

¶ Not open to School of Business Administration students.

No.	Title	Hour	Day	Bldg.	Instructor
164s	Labor Legislation and Social Insurance (3 cred.; jr., sr., grad.; prereq. Econ. 161)	III	TThS	211VH	Mr. Schmidt
172f	Economics of Transportation (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. including Econ. 6-7 or 83)	II	TThS	221VH	Mr. Schmidt
176f	International Commercial Policies (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	I	MWF	207VH	Mr. Blakey
176s	International Commercial Policies (See 176f)	I	MWF	207VH	Mr. Blakey
185w	Economics of Marketing (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	I	MWF	6VH	Mr. Vaile
191f-192w†§	Public Finance (6 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	III	MWF	221VH	Mr. Blakey
193s	State and Local Taxation (3 cred.; jr., sr., grad.; prereq. Econ. 191-192 or B. A. 58)	III	MWF	221VH	Mr. Blakey

COURSES OPEN TO GRADUATE STUDENTS ONLY

203f-204w	Seminar in Economic Theory (6 cred.; grad.)	VIII½-IX	MW	307VH	Mr. Garver
206s	Seminar in Market Prices (3 cred.; grad.)	VIII½-IX	MW	206VH	Mr. Vaile
207	*Theory of Demand* (3 cred.; grad.) *(Not offered)*				
208s	Production and Distribution (3 cred.; grad.)	VIII½-IX	TF	206VH	Mr. Stigler
233f-234w	Seminar in Public Finance (6 cred.; grad.)	VII	W	206VH	
		VII-VIII	F	206VH	Mr. Blakey
243-244	*Seminar in Money and Banking* (6 cred.; grad.) *(Not offered)*				
251	*Seminar in Industrial Relations* (3 cred.; grad.) *(Not offered)*				
257w	Seminar in Accounting Theory (3 cred.; grad.)	VIII-IX½	Th	206VH	Mr. Stevenson
	Discussion of Papers in European Periodicals	VIII-IX	Th	210VH	Mr. Altschul

BUSINESS ADMINISTRATION

For advisers see the Bulletin of the School of Business Administration.

COURSES OPEN TO BUSINESS ADMINISTRATION STUDENTS ONLY

No.	Title	Hour	Day	Bldg.	Instructor
51f*	Business Law: Contracts (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	II	ThS	4VH	Mr. Gray
	3	II	ThS	105VH	Mr. Wattson
	4	III	ThS	4VH	Mr. Wattson
	5	V	Th	4VH	Mr. Wattson
		IV	S	4VH	Mr. Wattson
52w*	Business Law: Agency, Partnership, and Corporations (3 cred.; jr., sr.; prereq. B. A. 51)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	II	ThS	4VH	Mr. Gray
	3	II	ThS	2VH	Mr. Wattson
	4	III	ThS	4VH	Mr. Wattson
	5	V	Th	4VH	Mr. Wattson
		IV	S	4VH	Mr. Wattson

* No credit will be allowed for B. A. 51, 52, or 53 until all three are completed.

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

§ Credit may not be received for both Economics 191-192 and B. A. 58.

No.	Title	Hour	Day	Bldg.	Instructor
53s*	Business Law: Negotiable Instruments (3 cred.; jr., sr.; prereq. B. A. 51)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	II	ThS	4VH	Mr. Gray
	3	II	ThS	2VH	Mr. Wattson
	4	III	ThS	4VH	Mr. Wattson
	5	V	Th	4VH	Mr. Wattson
		IV	S	4VH	Mr. Wattson
54f-55w‖	Elementary Accounting: Combined Course (8 cred.; jr., sr.; no prereq.)				
		V	MTWF	207VH	Mr. Lund
57f¶	Money and Banking (3 cred.; jr., sr.; no prereq.)				
		III	MWF	113VH	Mr. Langum
58f§¶¶	Elements of Public Finance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		IV	MWF	207VH	Mr. Borak
58w§¶¶	Elements of Public Finance (See 58f)				
	Sec. 1	IV	MWF	207VH	Mr. Blakey
	2	VI	MWF	207VH	Mr. Borak
58s§¶¶	Elements of Public Finance (See 58f)				
	Sec. 1	IV	MWF	207VH	Mr. Blakey
	2	VI	MWF	207VH	Mr. Borak
59f	Life Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	TThS	211VH	Mr. Graves
60w	Fire and Marine Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	MWF	6VH	Mr. Graves
61s	Casualty Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	MWF	6VH	Mr. Graves
62f	This course has been renumbered B. A. 54-55				
64w	Graphic Arts I: Elementary Principles of Design—Identical with Drawing and Descriptive Geometry 64 (3 cred.; jr., sr.; prereq. permission of adviser in School of Business Administration or in Department of Journalism)				
		IV	MWF	206E	Mr. Doseff
65f‡	Graphic Arts II: Processes—Identical with Drawing and Descriptive Geometry 65 and Journalism 65 (3 cred.; jr., sr.; prereq. permission of adviser in School of Business Administration or in Department of Journalism)				
		IV	MWF	110P	Mr. Barnhart
67s	Retail Store Management (3 cred.; prereq. Econ. 10 and 30. Open to College of Pharmacy students only)				
		I	MWF	1VH	Mr. Chute
68f	Sales Management (3 cred.; jr., sr.; prereq. B. A. 77)				
		II	TThS	1VH	Mr. Chute
69f	Retail Store Management (3 cred.; jr., sr.; prereq. B. A. 77)				
		III	TThS	2VH	Mr. Chute
69w	Retail Store Management (See 69f)				
		II	TThS	1VH	Mr. Chute
70f**	Statistics Survey (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Sec. 1	I	MWF	6VH	Mr. Graves
	2	VII	MWF	6VH	Mr. Graves
71f	Transportation: Services and Charges I (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Sec. 1	I	MWF	1VH	Mr. Nightingale
	2	II	MWF	1VH	Mr. Nightingale
	3	IV	MWF	1VH	Mr. Nightingale
71w	Transportation: Services and Charges I (See 71f)				
	Sec. 1	III	TThS	1VH	Mr. Nightingale
	2	VI	MWF	1VH	Mr. Nightingale

* No credit will be allowed for B. A. 51, 52, or 53 until all three are completed.
‡ Journalism course. A fee of $1 per quarter is charged students taking courses in Journalism.
§ Credit may not be received for both Economics 191-192 and B. A. 58.
‖ A combination of Economics 20, 25, and 26.
¶ Credit may not be received for both Economics 3 and B. A. 57.
** Not open to students who have received credit in Economics 5.
¶¶ Economics 191-192 (6 cred.) may be substituted for B. A. 58 as a core group requirement.

No.	Title	Hour	Day	Bldg.	Instructor
71s	Transportation: Services and Charges I (See 71f)				
	Sec. 1	III	MWF	1VH	Mr. Nightingale
	2	III	TThS	6VH	Mr. Nightingale
72w	Transportation: Services and Charges II (3 cred.; jr., sr.; prereq. B. A. 71)				
		VIII	MWF	1VH	Mr. Nightingale
72s	Transportation: Services and Charges II (See 72w)				
		I	MWF	112VH	Mr. Nightingale
76	*Credits and Collections* (3 cred.; jr., sr.; prereq. B. A. 77) *(Not offered)*				
77f	Survey in Marketing (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Lect.	I	T	1VH	Mr. Vaile
	Sec. 1	I	ThS	1VH	Miss Canoyer
	2	I	ThS	6VH	Mr. Chute
	3	VII	TTh	1VH	Miss Canoyer
77w	Survey in Marketing (See 77f)				
	Lect.	I	T	1VH	Mr. Vaile
	Sec. 1	I	ThS	1VH	Mr. Chute
	2	I	ThS	211VH	Miss Canoyer
	3	VII	TTh	1VH	Mr. Chute
77s	Survey in Marketing (See 77f)				
	Lect.	I	T	1VH	Mr. Vaile
	Sec. 1	I	ThS	1VH	Mr. Chute
	2	VII	TTh	1VH	Mr. Vaile
86w	Office Organization and Management (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		VII	MWF	210VH	Miss Donaldson
86s	Office Organization and Management (See 86w)				
		III	MWF	105VH	Miss Donaldson
87f	Report Writing (1 cred.; jr., sr.)				
		VI	T	1VH	Mr. Heilman and others
87w	Report Writing (See 87f)	IV	S	1VH	Mr. Heilman and others
87s	Report Writing (See 87f)	VI	T	1VH	Mr. Heilman and others
88w	Advertising (3 cred.; jr., sr.; prereq. B. A. 77 and Psy. 56)				
		II	MWF	1VH	Mr. Vaile
88s	Advertising (See 88w)				
		II	TThS	1VH	Mr. Vaile
89f	Production Management (3 cred.; jr., sr.; no prereq.)				
	Sec. 1	II	MWF	4VH	Mr. Cummins
	2	III	TThS	207VH	Mr. Cummins
89w	Production Management (See 89f)				
	Sec. 1	II	MWF	6VH	Mr. Filipetti
	2	III	MWF	1VH	Mr. Cummins
89s	Production Management (See 89f)				
	Sec. 1	I	MWF	6VH	Mr. Cummins
	2	II	MWF	207VH	Mr. Filipetti
	3	II	MWF	2VH	Mr. Cummins
91f	Tabulating Equipment Laboratory (1 cred.; jr., sr.; prereq. Econ. 26 and either 5 or B. A. 70)				
		VIII-IX	F	2VH	Mr. Boddy
91w	Tabulating Equipment Laboratory (See 91f)				
		IV-V	T	6VH	Mr. Gaumnitz
91s	Tabulating Equipment Laboratory (See 91f)				
	Sec. 1	IV-V	T	1VH	Mr. Gaumnitz
	2	VIII-IX	M	2VH	Mr. Boddy
92f	Accounting Practice Laboratory (1 cred.; jr., sr.; prereq. Econ. 26, open to accounting majors only)				
	Sec. 1	III-IV	S	307VH	Mr. Lund
	2	VI-VII	T	307VH	Mr. Lund
92w	Accounting Practice Laboratory (See 92f)				
		VI-VII	Th	307VH	Mr. Lund

No.	Title	Hour	Day	Bldg.	Instructor
93w	Accounting Laboratory (1 cred.; jr., sr.; prereq. Econ. 26, open to accounting majors only)				
		III-IV	S	307VH	Mrs. Youngs
93s	Accounting Laboratory (See 93w)				
		VI.-VII	T	307VH	Mrs. Youngs
94w	Cost Accounting Laboratory (1 cred.; jr., sr.; prereq. B. A. 152 or 130 or concurrent; open to accounting majors only)				
	Sec. 1	III-IV	T	307VH	Mr. Lund
	2	VI-VII	T	307VH	Mr. Lund
94s	Cost Accounting Laboratory (See 94w)				
		III-IV	S	307VH	Mr. Lund
95f	Auditing Laboratory (1 cred.; jr., sr.; prereq. B.A. 135 or concurrent)				
		III-IV	T	307VH	Mr. Miller
95s	Auditing Laboratory (See 95f)				
		VII-VIII	Th	307VH	Mr. Miller
96	This course has been renumbered Econ. 35.				
97f,98w,99s	Honors Course in Business Administration (Cred. ar.; jr., sr.; prereq. permission of the dean)				
		Ar	Ar	Ar	
101f-102w†	Advanced General Economics (6 cred.; sr., grad.; prereq. Econ. 6-7)				
	Sec. 1	I	TThS	105VH	Mr. Stigler
	2	II	MWF	2VH	Mr. Stigler
	3	II	TThS	207VH	Mr. Boddy
	4	III	MWF	105VH	Mr. Mudgett
	5	IV	MWF	113VH	Mr. Stigler
	6	VII	MWF	105VH	Mr. Boddy
101w-102s†	Advanced General Economics (See 101f-102w)				
	Sec. 1	I	TThS	6VH	Mr. Boddy
	2	VII	MWF	6VH	Mr. Mudgett
101s†	Advanced General Economics (1st qtr. of 101-102. See 101f-102w)				
		III	TThS	1VH	Mr. Boddy
102f†	Advanced General Economics (2nd qtr. of 101-102. See 101f-102w)				
		III	TThS	113VH	Mr. Mudgett
109w	Business Policy (3 cred.; sr., grad.; prereq. B. A. 101-102)				
		II	MWF	105VH	Mr. Reighard
109s	Business Policy (See 109w)				
		II	MWF	105VH	Mr. Reighard
112f‡	Business Statistics (3 cred.; jr., sr., grad.; prereq. Econ. 5 or B. A. 70)				
	Sec. 1	I	TThS	207VH	Mr. Kozelka
	2	IV	MWF	105VH	Ar
	3	VI	MWF	6VH	Mr. Kozelka
112w‡	Business Statistics (See 112f)				
	Sec. 1	I	TThS	2VH	Mr. Kozelka
	2	II	MWF	112VH	Ar
	3	III	TThS	211VH	Mr. Kozelka
112s‡	Business Statistics (See 112f)				
	Sec. 1	II	MWF	6VH	Mr. Kozelka
	2	II	TThS	205VH	Mr. Kozelka
130f	Cost Accounting (General Survey) (3 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
		I	MWF	105VH	Mr. Ostlund
130s	Cost Accounting (General Survey) (See 130f)				
		I	TThS	105VH	Mr. Ostlund
133s	Cost Accounting Methods (3 cred.; jr., sr., grad.; prereq. B. A. 130 or 153)				
		II	TThS	307VH	Mr. Ostlund
134f	Income Tax Accounting (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)				
		I	MWF	4VH	Mr. Reighard
134w	Income Tax Accounting (See 134f)				
		III	TThS	6VH	Mr. Reighard

† 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.

No.	Title	Hour	Day	Bldg.	Instructor
135f	Auditing and Public Accounting (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)	III	MWF	207VH	Mr. Reighard
135s	Auditing and Public Accounting (See 135f)	III	TThS	207VH	Mr. Reighard
136s	Internal Auditing and Accounting Control (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)	III	MWF	4VH	Mr. Reighard
139f‡	Advanced General Accounting (3 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
	Sec. 1	IV	MWF	2VH	Mr. Heilman
	2	VI	MWF	4VH	Mr. Heilman
139w‡	Advanced General Accounting (See 139f)				
	Sec. 1	I	MWF	4VH	Ar
	2	VI	MWF	105VH	Mr. Heilman
139s‡	Advanced General Accounting (See 139f)				
	Sec. 1	IV	MWF	4VH	Mr. Heilman
	2	VI	MWF	4VH	Ar
142f	Advanced Money and Banking (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	II	MWF	6VH	Mr. Upgren
	2	II	TThS	2VH	Mr. Myers
	3	VI	MWF	207VH	Mr. Marget
142w	Advanced Money and Banking (See 142f)				
	Sec. 1	II	TThS	105VH	Mr. Marget
	2	IV	MWF	6VH	Mr. Myers
142s	Advanced Money and Banking (See 142f)				
	Sec. 1	I	MWF	105VH	Ar
	2	III	TThS	105VH	Mr. Upgren
	3	VI	MWF	6VH	Ar
145s	Foreign Exchange (3 cred.; jr., sr., grad.; prereq. B. A. 142)	IV	MWF	205VH	Mr. Myers
146f	Investments (3 cred.; jr., sr., grad.; prereq. B. A. 155)	VI	MWF	1VH	Mr. Upgren
147f	Bank Administration (3 cred.; jr., sr., grad.; prereq. B. A. 142)	IV	MWF	6VH	Mr. Myers
148w	The Securities Market (3 cred.; sr., grad.; prereq. B. A. 146 and Econ. 149)	II	TThS	221VH	Mr. Upgren
150f-151w†‡	Accounting Practice and Procedure (6 cred.; jr., sr., grad.; prereq. Econ. 25-26)	II	MWF	207VH	Mr. Heilman
150w-151s†‡	Accounting Practice and Procedure (See 150f-151w)	III	MWF	207VH	Mr. Heilman
152f-153w†	Cost Accounting (6 cred.; jr., sr., grad.; prereq. Econ. 25-26)	II	TThS	6VH	Mr. Ostlund
152w-153s†	Cost Accounting (See 152f-153w)	IV	MWF	2VH	Mr. Ostlund
155f	Corporation Finance (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	III	MWF	1VH	Mr. Stehman
	2	VII	MWF	207VH	Mr. Upgren
155w	Corporation Finance (See 155f)				
	Sec. 1	III	MWF	4VH	Mr. Stehman
	2	VI	MWF	4VH	Mr. Upgren
155s	Corporation Finance (See 155f)				
	Sec. 1	II	TThS	207VH	Mr. Stehman
	2	VII	MWF	4VH	Mr. Upgren
156f	Finance Management (3 cred.; jr., sr., grad.; prereq. B. A. 155)	I	TThS	113VH	Mr. Stehman
158s	Governmental Accounting (3 cred.; sr., grad.; prereq. B. A. 139 or 151)	I	TThS	307VH	Mr. Heilman
159s	Public Utility and Railroad Accounting (3 cred.; sr., grad.; prereq. B. A. 139 or 151)	II	MWF	307VH	Mr. Stevenson

† 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.

No.	Title	Hour	Day	Bldg.	Instructor
165f	Economics of Public Utilities (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	I	TThS	2VH	Mr. Schmidt
	2	III	TThS	6VH	Mr. Garver
165w	Economics of Public Utilities (See 165f)				
		III	TThS	207VH	Mr. Garver
165s	Economics of Public Utilities (See 165f)				
	Sec. 1	I	MWF	4VH	Mr. Schmidt
	2	II	MWF	1VH	Mr. Schmidt
167f	Personnel Administration (3 cred.; jr., sr., grad.; prereq. Econ. 161)				
		II	MWF	205VH	Mr. Yoder
167w	Personnel Administration (See 167f)				
		III	TThS	105VH	Mr. Yoder
170w	Motion Economy (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 and B. A. 89)				
		VII	MWF	301VH	Mr. Cummins
171s	Production Standards (3 cred.; jr., sr., grad.; prereq. B. A. 170)				
		VI	MWF	301VH	Mr. Cummins
177w	Foreign Trade (3 cred.; jr., sr., grad.; prereq. Econ. 176)				
		I	MWF	207VH	Ar
180f-181w-182s	Senior Topics Courses (School of Business Administration seniors)				
	A. Accounting (6 cred.; fall and winter)				
		VI½-VII(f)	TTh	113VH	Mr. Rotzel
		I(w)	MWF	307VH	Mr. Reighard
	B. Business Finance (6 cred.; winter and spring)				
		VII	MWF	221VH	Mr. Upgren(w) Mr. Stehman(s)
	C. Marketing (9 cred.)				
		VI½-VII	TTh	205VH	Mr. Vaile(f,w) Mr. Chute(s)
	D. Personnel Management (9 cred.)				
		VI½-VII	TTh	221VH	Mr. Yoder
	E. Secretarial Practice (6 cred.; fall and winter)				
	(Secretarial students)	IV	MWF	210VH(f) 208V(w)	Miss Donaldson
	(Commercial Education students)	VII	MWF	210VH(f)	
	F. Statistics (9 cred.)				
		Ar	Ar	Ar(f,w)	Mr. Mudgett,
		III	MWF	206VH(s)	Mr. Kozelka
	G.§ Production Management (9 cred.)				
		VII	MWF	301VH(f) 115VH(w) 211VH(s)	Mr. Filipetti
	H. Insurance (3 cred.; spring)				
		IV	MWF	206VH	Mr. Graves
	I. Public Utilities and Transportation (6 cred.; fall and winter)				
		VI½-VII	TTh	206VH	Mr. Schmidt
	J. Office Management (3 cred.; spring)				
		IV	MWF	208VH	Miss Donaldson
183f,w,s	Practice Course (Cred. ar.; jr., sr., grad.; prereq. consent of adviser)				
		Ar	Ar	Ar	Members of the staff
184f§	Scientific Management in Industry (3 cred.; sr., grad.; prereq. Econ. 6-7)				
		VI	MWF	301VH	Mr. Filipetti
194s	Advanced Advertising Procedure (3 cred.; jr., sr., grad.; prereq. B. A. 88)				
		IV	MWF	115VH	Mr. Longstaff

§ Credit may not be received for both B. A. 181G and B. A. 184.

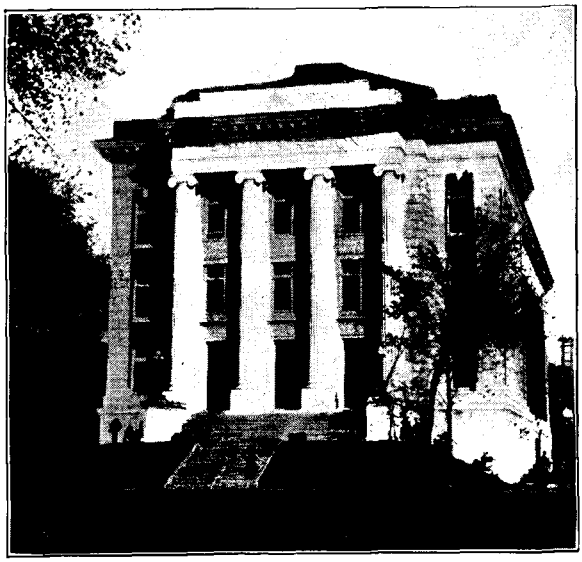
INDEX

BULLETIN OF
UNIVERSITY OF MINNESOTA

Education for Social Work

Special Offerings for
Summer Session 1939

First Term: June 19 to July 28
Second Term: July 31 to September 1



ADMINISTRATION BUILDING

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IN RESIDENCE, SUMMER, 1939

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LOWRY NELSON, Ph.D., Professor
GEORGE B. VOLD, Ph.D., Professor
ANNE F. FENLASON, M.A., Associate Professor
ALICE LEAHY SHEA, Ph.D., Associate Professor
RAYMOND F. SLETTO, Ph.D., Assistant Professor
MONICA K. DOYLE, M.A., Lecturer
MARY S. GOLD, M.A., Lecturer
HELEN E. HAYDEN, B.S., Lecturer
ELIZABETH ECKHARDT MAY, Ph.D., Lecturer
HELEN U. PHILLIPS, M.S.S., Lecturer
BENJAMIN E. YOUNGDAHL, M.A., Lecturer
FERN FISK, B.S., Instructor
DELBERT C. MILLER, M.A., Instructor
F. JOSEPH SCHNEIDER, Ph.D., Instructor
RUTH H. SWARTZOTT, B.A., Instructor
ROBERT M. DINKEL, M.A., Teaching Assistant
EDGAR C. MCVOY, M.A., Teaching Assistant
MARION F. WILLIAMSON, M.A., Teaching Assistant

EDUCATION FOR SOCIAL WORK

Social work is a rapidly expanding field of service which is increasingly recognized as requiring a broad professional education. Such training is provided in the thirty-eight schools of social work located in the United States of America and Canada, affiliated under the organization known as the Association of Schools of Social Work.

The social and industrial crisis through which we are passing demands a social statesmanship in which professionally prepared social workers have an outstanding opportunity and responsibility. The social wreckage resulting from our long protracted depression calls for ever finer skills of treatment if social and personal values among the people are to be conserved; and constructive planning for the future requires a broad basis of knowledge of social sciences and social experience.

The expanding activities of government in the field of social welfare, as recently exemplified in the national and state provisions for social security, and the changing relations between public and private agencies present to the social worker especially challenging opportunities for study and service.

Beginning students are not admitted to graduate training in social work during the Summer Session. Experienced workers employed in social work positions but without special training should find these short periods of study very useful. By special arrangement, a case work course ordinarily offered on a two-quarter basis, has been included in the offerings for the first term. Field opportunities may be provided for a limited number of students registered in this course. Courses in Rural Social Work, Public Welfare, and Case Work with Children, should be of value to workers in public agencies.

Courses in the Psychiatric Aspects of Case Work; Behavior Problems, Personality of the Child, Parent Education, Mental Measurements of Young Children, as offered by the Institute of Child Welfare; Abnormal Psychology as offered by the Department of Psychology; Introductory Psychiatry and Descriptive Neuropsychiatry as offered by the Medical School, should provide a wide range of courses for persons engaged in any aspect of work with children.

Field Training in Group Work will be a new departure during the first term, open to persons who have completed the required class courses.

COURSES IN SOCIOLOGY AND SOCIAL WORK

FIRST TERM

SOCIOLOGY

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF II, 6F., Mr. Dinkel; Sec. 2, MTWThF III, 11F., Mr. Schneider; Sec. 3, MTWThF I, 104J., Miss Williamson.)

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 9F.) Mr. Miller.

14su. Rural Sociology. A study of rural and urban relationships. The position of an agricultural class in an industrial society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF III; 2J.) Mr. Dinkel.

49su. Social Pathology. A survey course of 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, unemployment, physical diseases and defectiveness, mental deficiency, insanity, vagrancy, suicide, etc. (3 cred.; 3rd qtr. soph., jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.; MTWF IV and Th VI; 104J.) Mr. Sletto.

102su. Contemporary Penology. An analysis of some of the more important developments in recent attempts at the treatment of criminals and the prevention of crime. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci.. ed., phil., or psy., but including Soc. 53 or consent of instructor; MTWThF I; 109J.) Mr. Vold.

103su. Sociology of Conflict. Types of social conflict and their role in social life. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF II; 109J.) Mr. Vold.

140su. History of Social Theory. A rapid survey of the leading social theories from the time of the Greeks with special reference to the more recent developments of sociology. The theories are related to their social backgrounds. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VI; 109J.) Mr. Schneider.

160su. Population Problems. The major quantitative and qualitative problems of population in our contemporary society, including: population theories and doctrines since Malthus; the growth and distribution of population; changes in population composition and their social consequences; problems of human migration; urbanization and the ecology of the city; trends in mortality and morbidity; the quality of the population, significance of differential birth rates, heredity, and environment. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF III; 109J.) Mr. Sletto.

200su. General Seminar. (Ar.) Staff.

Social Work

129-130su.† Principles of Social Case Work. A study of the purposes, problems, and processes of generic social case work, including a study of the relationships between the individual and the social worker and community as contributory to the treatment of the problems presented. (6 cred.; grad.*; open only to students with experience in social work; prereq. Soc. Work 109, or equiv.; MTWThF I, II; 104J.) Mrs. Fenlason.

131su. Rural Social Work. Primarily a course on community relationships with respect to social work in small communities. (3 cred.; grad.*; prereq. Soc. Work 129, 153 or equivalent, MTWThF I; 9F.) Miss Hayden.

* Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

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

133su. Social Case Work in Health Problems. A course open only to students who are properly grounded in case work. (3 cred.; grad.*; prereq. Soc. Work 129, which may be taken simultaneously, and 136; MTWThF II; 25F.) Miss Gold.

146su. Community Organization and the Social Setting of Recreation. (3 cred.; jr., sr., grad.; prereq. 3 courses in social science including Soc. 47 or equivalent; MTWThF III; 104J.) Mrs. May.

153‡-154‡-155‡su. Field Training in Case Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. Soc. Work 129; ar.) Mrs. Fenlason, Miss Fisk, Mrs. Swartzott.

156‡-157‡-158‡su. Field Training in Group Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. Soc. Work 125; ar.) Miss Phillips.

200su. General Seminar. (Ar.) Staff.

221‡-222‡-223‡su. Graduate Field Training. (Cred. ar.) Mrs. Fenlason.

236su. Research Topics in Social Work. (Ar.) Staff.

SECOND TERM

SOCIOLOGY

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq; Sec. 1, MTWThF I, 109J., Mr. McVoy; Sec. 2, MTWThF III, 2J., Mr. McVoy.)

6su. Social Interaction. The basis and forms of social interaction and social relationships with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 2J.) Mr. Kirkpatrick.

14su. Rural Sociology. A study of rural and urban relationships. The position of an agricultural class in an industrial society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF III; 104J.) Mr. Nelson.

100su. Social Psychology. Primarily for sociology students. The social attitudes; their development and modification under social pressure; the interactions of individuals and groups. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 6, or Psy. 1-2, and 9 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VI; 109J.) Mr. Kirkpatrick.

110su. Rural Organization. A study of social organization as it affects living conditions in small towns and rural districts. Especially designed for rural social workers and specialists in rural sociology or agricultural economics. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF II; 104J.) Mr. Nelson.

200su. General Seminar. (Ar.) Staff.

* Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

‡ A fee of $3.50 is charged for each course.

SOCIAL WORK

138su. Case Work with Children. A course dealing with the problems of case work in children's agencies. (3 cred.; grad.*; prereq. Soc. Work 130, 153; MTWThF III; 109J.) Mrs. Shea.

139su. Psychiatric Problems in Social Case Work. A study of the intellectual and emotional factors in human adjustment and their significance in case work. (3 cred.; grad.*; prereq. Soc. Work 130, 154, 170 or Psy. 144-145 which may be taken simultaneously; MTWThF II; 109J.) Mrs. Shea.

151su. Public Welfare Administration. Will deal especially with the development and administration of public assistance and social security. (3 cred.; grad.*; prereq. Soc. Work 109, or equiv.; MTWThF I; 104J.) Mr. Youngdahl.

153‡-154‡-155‡su. Field Training in Case Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. Soc. Work 129; ar.) Mrs. Doyle, Miss Fisk.

200su. General Seminar. (Ar.) Staff.

221‡-222‡-223‡su. Graduate Field Training. (Cred. ar.) Mrs. Doyle.

236su. Research Topics in Social Work. (Ar.) Staff.

FIELD WORK

Case field work may be arranged in a special training center operated by the University or in a number of private and public agencies in the Twin Cities. Whenever possible, field work will continue through the two terms. When class courses in case work have been completed, applications may be made for a concentrated field assignment. Application for field work should be filed at an early date and should indicate two or more fields of major interest.

EXPENSES

The living expenses at the University are never very high, and this is true especially of the Summer Session.

At Pioneer Hall, rooms, without meals, may be secured for men from $15 and up for the first term and $12.50 and up for the second term. At Sanford Hall, room and board for women may be secured from $46 to $57 for the first term; in the second term, room only, at a rate varying from $15 to $18. Good accommodations for room may be had from $12.50 to $20 per month. Meals can be secured for 75 cents and up per day. In addition to the cafeterias conducted on the campus by the University, several good restaurants are to be

* Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

‡ A fee of $3.50 is charged for each course.

found in the immediate vicinity of the University. Further information concerning room and board may be obtained by addressing the director, Housing Bureau, Shevlin Hall. It is generally more satisfactory to engage accommodations after arrival than to make reservations in advance, except in the case of reservations at Sanford Hall and Pioneer Hall.

FEES

The following fees are payable by each full-time student at the time of registration and must be paid before registration is complete:

Tuition fee (per term)	$21.80
Incidental fee (per term)	3.20
Total fee (per term)	$25.00
Part time (4 credits or less) (per term)	$11.80
Incidental fee (per term)	3.20
Total (per term)	$15.00
General deposit	2.00
Field work fee for each field course	3.50

For the incidental fee of $3.20 a term the student receives the privileges of the Minnesota Union or Shevlin Hall, the Health Service, the *Summer Session Reporter* including the Official Daily Bulletin, and the university post-office service.

ADMISSIONS

Before coming to the University, prospective students should make certain that they are eligible for admission.

Admission to the two-year Graduate Course in Social Work is determined by the dean of the Graduate School in consideration of the recommendation of a departmental committee of major advisers in social work and the student's record.

In order that the committee of social work advisers may be in a position to make recommendations, the candidate is asked to send to the Department of Sociology and Social Work (1) duplicate transcripts of undergraduate and graduate work already completed; (2) the information called for upon duplicate blanks to be sent on request; (3) an informal biographical statement.

For detailed information concerning admissions, students should consult the Bulletin of the Graduate School and the Bulletin of the Summer Session.

REGISTRATION

In order that the short terms may prove of maximum value, and that the work of the courses may not be interfered with by late entrants, students must complete their registration, including the payment of their fees, on the days set aside for registration, or pay a late registration fee.

The regular registration days are:

For the first term, Monday, June 19, 9:00 a.m. to 4:00 p.m., and
Tuesday, June 20, 9:00 a.m. to 4:00 p.m.
For the second term, Monday, July 31, 9:00 a.m. to 4:00 p.m.

The late registration fees are as follows:

For the first term for those completing their registration on

Wednesday, June 21	$2.00
Thursday, June 22	3.00
Friday, June 23	4.00
Monday, June 26	5.00

No registrations are allowed for the first term after Monday, June 26, without the special permission of the dean of the school or college concerned, and the payment of the late registration fee of $5.

For the second term, for those completing their registration on

Tuesday, August 1	$2.00
Wednesday, August 2	3.00
Thursday, August 3	4.00
Friday, August 4	5.00

No registrations will be accepted later than Friday, August 4, without the special approval of the dean of the school or college concerned, and the payment of the late registration fee of $5.

No provision is made for allowing exemption from the late registration penalities to those who are unable to reach the University during the regular registration days.

INFORMATION

Correspondence with reference to the Summer Session and requests for circulars and additional information may be addressed to the Director, Summer Session, or to the Registrar, University of Minnesota, Minneapolis, Minnesota.

The Bulletin *of the* University *of* Minnesota

Course in Medical Technology

1939-1941

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Minneapolis, Minnesota

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Act of October 3, 1917, authorized July 12, 1918

COURSE IN MEDICAL TECHNOLOGY

GENERAL INFORMATION

A four-year Course in Medical Technology is offered jointly by the College of Science, Literature, and the Arts and the Medical School. No short course is given. The first two years are spent in the College of Science, Literature, and the Arts, the third year in the Medical School, and the fourth year in practical training in the University of Minnesota or affiliated hospital laboratories. Opportunities for practical training are limited to regularly enrolled students who have completed the first three years of the Course in Medical Technology as outlined in this bulletin.

Well-trained medical technologists are in demand. Positions may be secured in physicians' offices, clinics, hospitals, colleges, and research laboratories. The course is so arranged that theoretical training and practical experience are obtained in the various branches of clinical laboratory science. This broad training enables the graduate to qualify for positions requiring general or specialized laboratory experience.

As a general rule, a high school student who excels in scientific subjects will succeed in medical technology. Men are advised not to take the course because of limited opportunities for employment. The regular course in medicine, followed by graduate study, is advised for men or women who wish to become pathologists. Students desiring to specialize in bacteriology, chemistry, hematology, or parasitology are advised to register in the Graduate School after completion of the Course in Medical Technology. (See Bulletin of the Graduate School.)

Only those students for whom a prediction of reasonable success in college work can be made should register for the Course in Medical Technology.

Entrance regulations.—Graduates of accredited high schools may enter at the beginning of any quarter, but the following program is based on registration in the fall quarter only. Students entering in the winter or spring quarters will find it difficult to register for the regular program. Candidates desiring advanced standing should send an official transcript of their college record to the registrar of the University of Minnesota for evaluation before registering. Nursing credits of college grade may be used for advanced standing. For matters relating to admission, consult the General Information Bulletin.

Registration.—All prospective students are urged to consult the special advisers in the main laboratory on the fourth floor of the Elliot Memorial Hospital of the University of Minnesota Hospitals. This should be done in person if possible. Students who have not excelled in scientific subjects in high school or college should apply to the hospital advisers for guidance

before registering in this course. Students with physical handicaps must have their registration approved in the same way.

During the first year, advisers in the Junior College office (room 106 Folwell Hall) may be consulted. After the freshman year, all students must submit their registration for approval to the special advisers in the hospital laboratory.

Be sure to note prerequisites before registering. High school students who anticipate taking the Course in Medical Technology at the University of Minnesota should take German and chemistry.

Limited registration.—The number of students accepted into the junior class each fall quarter will depend upon the number of places available in the laboratory for practical experience during the senior year. Application for admission to the junior class must be made by all students including those registered the first two years at the University of Minnesota. All courses listed as requirements for the first two years in the Bulletin of the Course in Medical Technology must be completed before applications will be accepted. Students who have failed to complete these requirements at the end of the sophomore year but will complete them during the junior year are requested to submit their applications before July 1. No applications will be accepted after July 1 if the student desires to be a candidate for the fall class. The selection from the applicants will be made upon the basis of their scholastic standing during the first two years. Selection will be made soon after July 1 and applicants notified by July 15. Accepted applicants will receive a statement for a preliminary fee of $10 to be applied on the fall quarter's tuition fee. This must be paid within ten days after the notification of acceptance and will not be returned if the student fails to matriculate.

Scholarship.—A minimum of ninety credits with an average of one honor point per credit must be earned in the first two years in the College of Science, Literature, and the Arts. A "C" average in required subjects is necessary for admission to the Medical School.

Ninety credits and ninety honor points are required in the last two years in the Medical School.

Degrees.—Upon satisfactory completion of the prescribed course, the degree of bachelor of science in medical technology will be conferred by the Board of Regents. Students completing the course with an average of 2 honor points for each credit may graduate *cum laude* upon recommendation of the Committee on Honors.

Fees.—Consult the General Information Bulletin for information regarding fees.

Student aid.—Students with insufficient funds to finance their education should apply to the registrar's office for the bulletin, University Aids for Student Expenses. 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.

Curriculum.—Students should follow the prescribed curriculum if they wish to finish this course in the usual time. For detailed information about

the individual subjects in the curriculum, consult the Combined Class Schedule Bulletin which is issued at the time of registration in the College of Science, Literature, and the Arts.

Information.—The Course in Medical Technology is in charge of a special committee of the Medical and Graduate Schools, consisting of William A. O'Brien, chairman, W. P. Larson, N. H. Lufkin, John F. Noble, L. G. Rigler, and A. H. Sanford. For further information, address the chairman at the University of Minnesota Hospitals, Minneapolis, Minnesota.

DESCRIPTION OF COURSES

FRESHMAN YEAR

Comp.4f-5w-6s. Freshman Composition. (9 cred.; prereq. placement test), or English A-B-C, or exemption from requirement.

Zool.1f-2w-3s. General Zoology. (10 cred.; no prereq.)

Ger.1f-2w-3s.* Beginning German. (15 cred.; no prereq.)

Inorg.Chem.4f-5w. General Inorganic Chemistry. (8 cred.; primarily for predental and medical technology students; prereq. entrance credits in chemistry.)

Inorg.Chem.11s. Qualitative Chemical Analysis. (4 cred.; primarily for predental and medical technology students; prereq. Inorg. Chem. 3 or 5.)

SOPHOMORE YEAR

Phys.1f-2w-3s. Introduction to Physical Science. Lectures and experimental demonstrations of the principles underlying physical phenomena. (9 cred.; prereq. high school algebra and plane geometry.)

Ger.30f-31w-32s. Medical German. (9 cred.; prereq. Ger. 3.)
or Ger.33w-34s. Medical German. (10 cred.; prereq. Ger. 3.)

Org.Chem.1f-2w. Elementary Organic Chemistry. (8 cred.; primarily for premedical and predental students; prereq. Inorg. Chem. 11.)

Zool.21f. Histology. (5 cred.; prereq. Zool. 1-2-3.) (Sections limited to 40 each. Written permission must be obtained from the Junior College office, 106 Folwell Hall.)

Anal.Chem.7s. Quantitative Analysis. (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry.)

Bact. and Immun.41s. General Bacteriology. (5 cred.; prereq. 10 cred. in chemistry and 4 cred. in botany or zoology.)

JUNIOR YEAR

Physiol.100f-101w. Physiological Chemistry. (13 cred.; prereq. zoology, organic chemistry, and physics.)

Anat.165f-166w. Hematology. (8 cred.; prereq. Zool. 21f; written permission of instructor required before registering.)

Zool.51f. Introductory Animal Parasitology. (5 cred.; prereq. Zool. 1-2-3.) (Sections limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall.)

Bact. and Immun.102s. Medical Bacteriology. (4 cred.; prereq. Bact. and Immun. 41.)

* Those entering with high school German credits should consult the Junior College adviser, 106 Folwell Hall, before registering in the language course. Altho German is recommended for all students starting a foreign language, French may be completed at the University if the student enters with high school or college French credits.

Bact. and Immun.116w. Immunity. (3 cred.; prereq. Bact. and Immun. 41 and 102.)

Anat.3s. Elementary Anatomy. (3 cred.; primarily for nurses; no prereq.)

Physiol.4s. Human Physiology. (4 cred.; prereq. 1 qtr. zool., 1 qtr. chem.)

Med.Tech.50f-51w. Clinical Diagnosis. Cred. ar.; written permission of hospital adviser required before registering.)

Med.Tech.52f,w,s. Junior Practical Work. (Cred. ar.; written permission of hospital adviser required before registering.)

SENIOR YEAR

Med.Tech.100f,w,s. Senior Practical Work. (45 credits minimum). Rotating service in all the clinical laboratories of the University of Minnesota Hospitals, Minneapolis General Hospital, or Ancker Hospital, St. Paul. Service includes blood, urine, feces, gastric contents, blood chemistry, bacteriology, serology, basal metabolism, electrocardiography, tissue technique, etc. Registration in practical work should bring the total number of calendar months to at least 12.

ELECTIVES

The following electives are suggested, but others may be taken:

Bact. and Immun.114s. Molds, Yeasts and Actinomycetes. (4 cred.; jr., sr., grad.; prereq. Bact. and Immun. 41 or 101.)

Draw. and Des. Geom.44f,w,s. Lettering. (1 cred.; no prereq.)

P.M.&P.H.3f,w,s. Personal Health. (2 cred.; fr., soph.; no prereq.)

P.M.&P.H.50fs. Public and Personal Health. (3 cred.; note registration requirement; no prereq.)

Psy.1f-2w or 1s,2s. General Psychology. (6 cred.; note registration requirement; no prereq.)

Psy.3s. Psychology Applied to Daily Life. (3 cred.; soph., jr., sr.; prereq. 1-2.)

Soc. and Soc. Work 1f,w,s. Introduction to Sociology. (5 cred.; note registration requirement; no prereq.)

Soc. and Soc. Work 6f,w,s. Socal Interaction. (3 cred.; soph., jr., sr.; prereq. Soc. and Soc. Work 1.)

Zool.22w. Comparative Anatomy. (5 cred.; note registration requirement; prereq. Zool. 1-2-3.)

SPECIAL NOTICE

A modification of this program will be made for transfer students according to approved credits.

Students may secure advanced standing by registration in the Summer Session. (See Summer Session Bulletin.) A course in hematology may be offered during the first quarter of the Summer Session. Medical technology students who take this course may substitute it for Anat. 165-166, Hematology.

BULLETIN OF THE
UNIVERSITY OF MINNESOTA

General Announcement

of the

Center for Continuation Study

1939-40

Center for Continuation Study

Vol. XLII No. 24 April 28 1939

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

PURPOSES OF THE CENTER

In order to extend and improve its services to those citizens who wish to continue their education beyond the formal limits of their secondary, college, or professional schooling, the University of Minnesota has established the Center for Continuation Study.

The Center is devoted primarily to the use of men and women who wish to spend relatively short periods of time in serious and intensive study of problems related to their professional, civic, or cultural interests. In general, the studies thus pursued are those which the University is especially qualified to direct.

The purposes of the new department are epitomized in its name. It is a *center* in which students live and work together during their period of residence on the campus. It is a *continuation* school in the sense that it is designed to give opportunities for acquiring further education to those who already have received the usual professional, technical, and general instruction in the regular schools and colleges. Emphatically it is a place for definite *study* rather than for conventions or social gatherings.

The Center, moreover, does not duplicate the work of other agencies giving instruction to adults. The public schools with their evening classes, the various emergency educational projects financed by the Federal Government, and many privately operated institutions offer opportunities to the citizen who wants to repair deficiencies in his schooling or to extend his education along general cultural and vocational lines. The University itself, through its extension classes, correspondence study instruction, technical conferences, professional institutes, short courses, summer sessions, public lectures, and dramatic and musical series, provides a wide variety of facilities for continuing education. The new Center attempts to supplement, not to supplant, these various services.

WORK OF THE CENTER

The Center operates chiefly through a series of schools and institutes, organized and directed by the University, and designed to serve the interests of professional, occupational, civic, and cultural groups. Instructors in the courses aim to present information accurately, to discuss issues impartially, and to examine theories critically.

Groups desiring courses of a professional, technological, or cultural nature are invited to confer with the director of the Center concerning their needs. The University on its own initiative also announces courses from time to time. In every instance the University will engage the faculty, prepare the plan, and assume full responsibility for the conduct of the course.

Each course, school, or institute in the Center is unique, with its own name, its own time schedule, its own curriculum, its own faculty, and its own life. An institute of three days or a school of three weeks or more; a one-day conference or a one-week seminar; a student body of professional leaders in medicine, dentistry, pharmacy, engineering, or education; an institute for editors, social workers, or county agents; an institute on banking, insurance, or legislation; programs for civic club members who wish to study economics, international relations, civil service, or some aspect of government—these and many other combinations are possible.

The Center provides a flexible plan by which men and women may learn what they need to learn. Institute programs in every instance are organized to serve the needs of the group. The work itself calls for study—serious study—and for class discussion, seminar work, and, in some instances, research and the preparation of papers.

TYPES OF INSTITUTES

Since it opened in November, 1936, the Center has housed and conducted many conferences and institutes. Among the subjects studied and discussed are the following: co-operative management, nursery teacher training, pharmacy, probation and parole problems, social welfare administration and supervision, hospital administration, adult education, photography, international relations, architectural concrete, Scandinavian culture, police training, parent-teacher leadership, traffic safety, structural engineering, educational guidance, general collegiate education, religious and ethical philosophy, trade and industrial co-ordination in education, technique of writing, family welfare administration and supervision, library practice and problems, Boy Scout executive leadership, traumatic surgery, obstetrics and gynecology, pediatrics, internal medicine, diagnostic radiology, heart disease, cereal chemistry, banking and investment problems, ophthalmology and otolaryngology, welfare and relief and civil service problems, water works and sewer system operation, plumbing inspection, air conditioning, and welding design.

For the future, a list of subjects similarly diverse is under consideration: modern business management, economics for engineers, factors underlying economic progress, public school teachers' problems, safety education, recreation leadership, medico-legal practice and problems, insulation, refrigeration, club organization and leadership (in communities and in schools), interior decorating and design, house and furniture refinishing, security for the family, racial problems, child health, retail merchandising, laboratory tests and their interpretation, diseases of children, public administrative law, labor relations law, taxation, police techniques, general and life insurance, and vocational guidance.

This list of diverse subjects indicates the scope of the Center's service. Whenever a specific group-need for a particular type of education is shown

to exist and other facilities already operating cannot cope with the problem, the Center will try to satisfy the need.

UNIVERSITY PRIVILEGES

Those registered in institutes or courses conducted by the Center are admitted on a student basis to all regular university privileges save those which are restricted to undergraduates as such and those which are restricted to students registering for a full term or quarter. Those registered at the Center may use the university libraries and gymnasium, and may attend all general university lectures and functions.

FACILITIES OF THE CENTER

The building of the Center contains dormitory facilities for seventy-eight persons, dining room, lounge, library, chapel, classrooms, seminar rooms, and offices. A garage in connection is available for use of students of the Center.

The cost of rooms per person for institute members is given below:

	Per Day	Per Week
Double room, without bath, each person	$1.00	$ 5.00
Single room, without bath	1.25	6.25
Double room, with bath, each person	1.25	6.25
Single room, with bath (number very limited)	1.75	8.75
Large bay-window double room, with bath, each person	1.50	7.50
Suite for four persons (two bedrooms, living room, and bath), each person	1.50	7.50
Suite for two persons (bedroom, living room, and bath), each person	1.75	8.75

These rates do not apply to those not registered in institutes. For persons engaged in individual studies, a different scale applies.

Meals may be obtained separately.

Garage rates are as follows: day parking 20 cents; 24-hour parking 50 cents.

Tuition charges vary with the length of schools and the expense of securing instructors.

PROPOSALS FOR SCHOOLS

The Center will be glad to receive proposals for schools under the above conditions from any interested persons or organizations, and to give more detailed information upon any phase of Center activities and service. Inquiries and suggestions should be addressed to the Director, Center for Continuation Study, University of Minnesota, Minneapolis.

The Bulletin *of the* University *of* Minnesota

Naval Science and Tactics Announcement for the Year 1939-1940

Vol. XLII *No. 25* *April 29 1939*

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FACULTY

GUY STANTON FORD, Ph.D., Litt.D., LL.D., L.H.D., President

MALCOLM M. WILLEY, Ph.D., University Dean and Assistant to the President

FRANK H. KELLY, JR., Captain, U. S. Navy, U. S. Naval Academy, 1910, Professor of Naval Science and Tactics

HAROLD F. PULLEN, Lieutenant Commander, U. S. Navy, U. S. Naval Academy, 1922, Associate Professor of Naval Science and Tactics

CALVIN A. WALKER, JR., Lieutenant, U. S. Navy, U. S. Naval Academy, 1929, Assistant Professor of Naval Science and Tactics

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GENERAL INFORMATION

REGISTRATION

Students must be regularly enrolled in the University as candidates for a degree and will not be permitted to register for the courses in Naval Science until they have been accepted by the Professor of Naval Science and Tactics.

NAVAL RESERVE OFFICERS' TRAINING CORPS

This department is a unit of the Naval Reserve Officers' Training Corps established by Act of Congress approved March 4, 1925. The department is administered by commissioned officers of the regular Navy, all of whom are graduates of the United States Naval Academy, with considerable experience at sea. They are detailed by the Navy Department and serve under appointment by the president and the administrators of the University of Minnesota as professors, associate professors, or assistant professors. This department offers undergraduate four-year courses which may be counted toward a degree. Satisfactory completion of the four-year course and one cruise of about three weeks' duration on a naval vessel at the end of the junior year will qualify the student 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 a prescribed physical examination. If commissioned as a reserve officer he may be detailed for active duty only upon his own request, except in case of national emergency.

Courses in naval science and tactics are given for those who intend to complete the four years of training for a commission in the Naval Reserve. Only students signifying such a purpose will be accepted.

The courses in naval science and tactics are divided into two groups: Naval Science, and Navigation. Navigation is covered in three quarters at the convenience of the student. It must be completed prior to the end of the junior year, but naval students should finish it prior to embarking on a sophomore cruise.

Naval Science I and II with Navigation comprise the Basic Course in training. Naval Science III and IV, or IIIa and IVa, plus any uncompleted navigation, comprise the Advanced Course. A student who has completed the Basic Course is admitted to the Advanced Course upon the approval of his application by the professor of naval science and tactics, and upon his agreement to complete the course and take an Advanced Course cruise before his graduation, and upon passing a prescribed physical examination. The students enrolled in the Naval Science course become a part of the Naval Reserve Officers' Training Corps, units of which are maintained at Harvard University, Yale University, Northwestern University, University of California, University of Washington, Georgia School of Technology, University of California at Los Angeles, Tulane University of Louisiana, and the University of Minnesota. The nation depends in part upon these units to maintain a reserve of qualified naval leaders for future national emergency.

Eligibility to membership in the Naval R.O.T.C. is limited to students who are citizens of the United States, not less than fourteen years of age, and whose condition indicates that they are physically and mentally qualified to perform naval duty, or will be so qualified upon arrival at military age. Citizenship must be substantiated by a birth certificate or naturalization papers.

Before admission to Naval Science I, students must pass a prescribed physical examination and must agree to be immunized to typhoid and paratyphoid fevers and smallpox provided they do not furnish satisfactory proof of immunity from these diseases. The number of students admitted each year is limited in order to keep the full strength of the unit at approximately two hundred students.

Uniforms and equipment are furnished to students by the government without charge. If the student severs connection with the N.R.O.T.C. prior to receiving a commission in the Naval Reserve, uniforms and equipment must be returned. Upon satisfactory completion of the course the uniform becomes the property of the student. All textbooks used in the course are loaned to the student.

The Navy Department pays monthly commutation of subsistence to juniors and seniors who maintain a satisfactory standing and attendance. This, with cruise pay, amounts to about one hundred seventy-five dollars ($175) for the two years.

N.R.O.T.C. practice cruises will be held annually as prescribed by the Navy Department. Attendance at one Advanced Course cruise is required of all students enrolled in the Advanced Course. Basic Course students may be authorized to take cruises, and while doing so will receive subsistence but no pay. All N.R.O.T.C. students attending cruises are furnished transportation and subsistence by the United States Government.

COURSES AND CREDITS

Navigation I, II, and III. Quarter hours 9. Quarter credits 9.

Naval Science I. Two lectures and one drill hour. Quarter hours 9. Quarter credits 4½.

Naval Science II. Two lectures and one drill hour. Quarter hours 9. Quarter credits 4½.

Naval Science III. Three lectures and one drill hour. Quarter hours 12. Quarter credits 9.

Naval Science IV. Three lectures and one drill hour. Quarter hours 12. Quarter credits 9.

Total quarter hours 51. Total quarter credits 36.

Students with engineering major—

Navigation I, II, and III. Quarter hours 9. Quarter credits 9.

Naval Science I. Two lectures and one drill hour. Quarter hours 9. Quarter credits 4½.

Naval Science II. Two lectures and one drill hour. Quarter hours 9. Quarter credits 4½.

Naval Science IIIa. Two lectures and one drill hour. Quarter hours 9. Quarter credits 6.

Naval Science IVa. Two lectures and one drill hour. Quarter hours 9. Quarter credits 6.

Total quarter hours 45. Total quarter credits 30.

Credit is given for summer cruises at sea in the amount of ¾ quarter credits for each two weeks of cruising, total credits not to exceed 5 for the entire course. Cruise credits do not reduce the number of credits required for the degree in a student's major, but are in excess of the degree requirements. Navigation credits and naval science credits, however, are accepted as fulfilling degree requirements.

DESCRIPTION OF COURSES

NAVIGATION

Navigation courses taught under this department are open to all students and each course is repeated each quarter.

Navigation I. Navigation and Nautical Astronomy. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, sextants, chronometers, dead reckoning. Three hours per week for one quarter. Prerequisite, plane trigonometry.

Navigation II. Navigation and Nautical Astronomy. Piloting, time, solar ephemeris, determination of latitude and longitude by the sun, azimuth, astronomical triangles, lines of position, deep sea navigation. Three hours per week for one quarter. Prerequisite, Nav. I.

Navigation III. Celestial Navigation. Sidereal time, determination of position by moon, stars, and planets, short methods, tides, chart work, star identification, theory and principles of gyroscopes, gyrocompasses. Three hours per week for one quarter. Prerequisite, Nav. II.

NAVAL SCIENCE BASIC COURSE

Naval Science I. Two hours classroom work and one hour of drill or practical exercise per week.

(a) Naval History.

(b) Ordnance. Practical and theoretical instruction in infantry and artillery, construction of guns, ammunition, powder and explosives.

(c) Seamanship. Boats, types of ships, buoys, ground tackle.

(d) Communications. Morse code, semaphore system, flags, pennants, signals.

Naval Science II. Two hours classroom work and one hour of drill or practical exercise per week. Prerequisite, Nav. Sci. I.

(a) Ordnance, Breech mechanisms, firing circuits, gun sights, depth charges, torpedoes, mines, and fire control apparatus.

(b) Gunnery. Principles of naval gunnery, gunnery training, safety precautions, range finding, range keeping, boresighting, gunnery installations, and control of gun fire in various types of naval vessels.

NAVAL SCIENCE ADVANCED COURSE

The Advanced Course, aside from navigation, consists of three lectures and one drill hour per week, with the exception of engineering students for whom the course may be abridged by the omission of engineering. These students take Naval Science IIIa instead of Naval Science III, and Naval Science IVa instead of Naval Science IV. The abridged course is designated

for, and limited to, students registered in engineering majors. Each such student's program must include at least three hours weekly of engineering subjects, approved by the chairman of the Department of Naval Science and Tactics. Completion of the Basic Course is a prerequisite for admission to the upper division, or Advanced Course. Applicants for further naval training must be acceptable to the University and the professor of Naval Science and Tactics, and must execute the following written agreement in order to be entitled to pay or subsistence fixed by the Secretary of the Navy in accordance with law.

CONTRACT

In consideration of commutation of subsistence to be furnished in accordance with law, I hereby agree:

First, to continue training in the advanced course of the Naval Reserve Officers' Training Corps until the completion thereof as a prerequisite to graduation unless sooner discharged by orders of the Bureau of Navigation, Navy Department;

Second, to devote to naval training the number of hours per academic week prescribed for the advanced course in the Department of Naval Science and Tactics by the current annual catalogue of this educational institution, and to devote five hours per week, when prescribed, to such naval training as is ordered;

Third, to participate in one advanced course cruise;

Fourth, to be immunized to typhoid and paratyphoid fevers and smallpox when and as directed to do so by the Professor of Naval Science and Tactics unless satisfactory proof of immunity from these diseases is furnished.

Naval Science III. Three hours of classroom work and one hour of drill or practical exercise per week. Prerequisite, Nav. Sci. II.

(a) Seamanship. Hulls and fittings, ground tackle, steering of steamers, duties of officers, weather, towing, maneuvering, emergencies, naval leadership, rules of the road, collision and grounding cases, command.

(b) Gunnery. Naval gunnery and fire control, employment of weapons and ships in attack, training, battle problems.

(c) Naval Engineering. Engineering processes, boilers, turbines and reciprocating engines, auxiliaries, internal combustion engines, operation and management of the engineering department of a naval vessel, fuel, evaporators, economy.

(d) Tactics. Elementary tactics, maneuvers, naval battles of the World War, estimate of the situation and formulation of orders.

(e) Communications. Organization and operation of the naval communication service, codes and ciphers, radio direction finding, underwater sound.

Naval Science IIIa. Same as Naval Science III, with the omission of naval engineering. Two hours classroom work and one hour of drill or practical exercise per week. Prerequisite, Nav. Sci. II.

Naval Science IV. Three hours of classroom work and one hour of drill or practical exercise per week. Prerequisite, Nav. Sci. III.

(a) Administration. Naval policy and administration, naval organization ashore and afloat, Navy Regulations, discipline, Naval Reserve.

(b) Aviation. Mission and history of naval aviation, types and uses of naval aircraft, aerology, theory of flight, aircraft engines, aircraft instruments, aircraft carriers, tactics of naval aircraft, air navigation.

(c) Military Law. Naval law, military government, martial law, articles for the government of the Navy, rules of evidence, procedure of naval courts and boards.

(d) Naval Engineering. Electricity aboard ship, magnetism, generators, alternators, motors, storage batteries, electric drive, switchboards, searchlights, interior communication, electric steering, gunnery circuits, radio and sonics.

Naval Science IVa. Same as Naval Science IV, with the omission of naval engineering. Two hours classroom work and one hour of drill or practical exercise per week. Prerequisite, Nav. Sci. III or IIIa.

Those who complete the Advanced Course, if recommended, will on their application be appointed as ensigns in the Volunteer Reserve without professional entrance examinations. Members of the Volunteer Reserve who associate themselves with organized divisions and who attend drill with a division become eligible for transfer to the Organized Reserve. The Organized Reserve carries with it drill pay and training duty pay, and better opportunities to qualify for promotion.

Bulletin of University of Minnesota

DEPARTMENT OF AGRICULTURE

SHORT COURSES

1939-40

VOL. XLII NO. 29 MAY 17 1939

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minn. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 12, 1918.

INDEX

SHORT COURSES offered by the Department of Agriculture of the University of Minnesota are given for two main purposes: First, to meet the requests of specific groups for information bearing on their special problems, and second, to give opportunity for people of the state generally to secure new and up-to-date information on agriculture and home economics. Enrollments are limited for a few of the highly specialized courses that give more intensive training. Otherwise, these short courses are open to anyone who desires to attend. This bulletin has been prepared to give general information on all short courses offered during the year ending June 30, 1940.

FOR FURTHER INFORMATION

Write to L. A. Churchill, Director of Short Courses, University Farm, St. Paul, Minnesota

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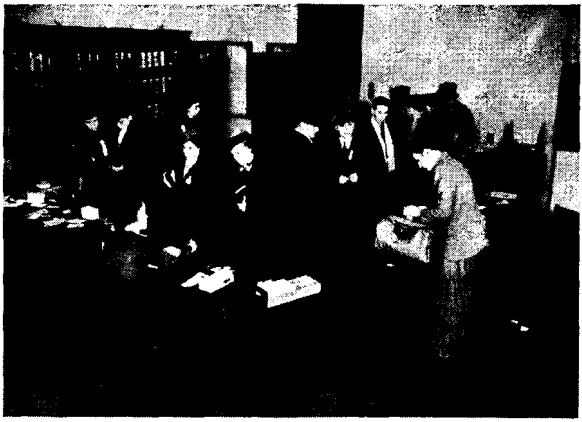


Short Course Visitors Registering at University Farm

FARM AND HOME WEEK

January 15-19, 1940

Division of Agricultural Extension

Farm and Home Week has become established through 39 years as the annual opportunity for farm men and women to come to University Farm and avail themselves of the services of the various divisions of the Department of Agriculture. It offers five days of classes, conferences, and entertainment.

Above all else, Farm and Home Week is a big one-week school in what is latest and best in everyday farming and home management and practice. Two class hours each forenoon and three each afternoon will be the general plan this year. During each of these hours, as many as a dozen different lectures, discussions, and demonstrations will be going on at once. Each visitor will have a complete program and may go where he pleases.

Three special conferences are held in connection with Farm and Home Week each year:

(1) Community Leadership Conference, including community leader training schools, work of community councils, parliamentary practice, duties of officers, planning and carrying out community programs, promoting attendance and participation, the place and use of organized play and music in community programs.

(2) The Rural Youth Conference, designed primarily for members and leaders of Minnesota's rural youth groups. Variety and distinctiveness

will characterize the topics to be offered, the aim being to present subjects of unusual interest and value and at the same time to give the young people a type of program not ordinarily available in their home communities.

(3) The 4-H Club Leaders' Conference, offered under the direction of the 4-H Club Department, gives opportunity to the 4-H leaders to take part in discussion of their problems. The purpose of 4-H demonstrations and various problems involved in staging and coaching them will receive major emphasis. Four-H records in connection with county and state events in junior leadership work, etc., will also be featured. Music, dramatics, and other live topics will be included.

Announcement folders will be available on request early in December preceding the Farm and Home Week.

ADVANCED CREAMERY OPERATORS

March 12, 13, 14, 1940

Division of Dairy Husbandry

The Advanced Creamery Operators' Short Course, a symposium for butter manufacturers, is intended for persons primarily interested in the butter industry or in certain phases of it. The course will consist of a review of recent investigations and problems which are of vital interest to the industry. Several prominent practical and technical men will appear on the program, together with the members of the dairy division staff. Fee: $5.00.

BOYS' AND GIRLS' 4-H CLUB WEEK

June—First or Second Week

Division of Agricultural Extension

This event will run four days and is intended for two special groups in 4-H work. The first includes several hundred 4-H club members who have made outstanding records in their project work and because of this are selected to represent their club and county in this state event. It also includes delegates from many of the 4-H clubs in the state wishing to be represented. The second group includes the county club agent and both

adult and junior local leaders. Because of limited housing facilities, the attendance from each county is limited to fifty.

The purpose of 4-H Club Week is to bring together a large number of 4-H club members, representing every county in the state, and to give them a brief course in project work and the general 4-H activities, as well as to provide them an interesting and inspirational time. For the leaders who attend, the purpose is to give a brief course in leadership training.

Recreation Time at State 4-H Club Week

CATTLE FEEDERS' DAY

June—Write Short Courses Office for date

Division of Animal Husbandry

This one-day program consists primarily of reports of experimental results in feeding and breeding and is intended to give cattle producers and feeders first-hand information on subjects that are important to the cattle industry.

CREAMERY OPERATORS

January 3 to February 28, 1940

Division of Dairy Husbandry

The Creamery Operators' Short Course, established in 1893, was the first short course to be offered by the University of Minnesota. To date more than 4,000 students have attended the course. It has unquestionably had a marked influence on the creamery industry throughout the state.

The course is designed for those who are seeking fundamental knowledge pertaining to milk

and the manufacture of butter. Those who attend the course must have had not less than two years of high school training and one year of practical experience in a dairy plant. Admittance to the course is by application only and will be limited to 45 students.

Those who attend will be required to take the following subjects: dairy chemistry, dairy bacteriology, dairy arithmetic, creamery accounting, buttermaking, business English, poultry management, dairy cattle feeding, and testing milk and milk products. During the eight weeks, a number of prominent speakers will address the class on current problems of the industry.

A tuition fee of $15 is charged. In addition, there will be a hospital fee of $1. The cost of books, white clothing, etc., will be about $15. For those who lack the formal educational requirement for entrance, a special entrance examination will be arranged.

DAIRY FARMERS' DAY

June—Write Short Courses Office for date

Division of Dairy Husbandry

This is a day set aside for dairy farmers to visit University Farm and to take part in a program of subjects of special interest to dairy producers. Experiments in progress in the Dairy Division are explained. Cow-testing results are summarized and awards presented, along with reports on progress of bull records and other phases of organized herd improvement work. Practical talks and demonstrations relating to dairy feeding, breeding, and management are presented.

EDITORS' SHORT COURSE

May—Write Short Courses Office for date

Office of Publication and Department of Journalism

This course is aimed directly at the needs of persons engaged in various phases of rural weekly newspaper publishing. News reporting and editing, advertising and circulation problems, and general business and editorial policies are dealt with in talks, demonstrations, and other program features. Special cooperation is extended to the University in the conduct of this course by the Min-

nesota Editorial Association, the University Printing Department, and The Minneapolis Journal. Open to everyone interested.

FARM STRUCTURES CONFERENCE

March 1, 1940

Division of Agricultural Engineering

In addition to a fine program of talks on subjects of vital importance to builders, the Farm Structures Conference offers a display of materials and visits to the agricultural engineering shops and to the cooperative tile-testing laboratory. There is also a chance to secure information on topics on which reliable data are otherwise difficult to get. Farmers, builders, and dealers are invited.

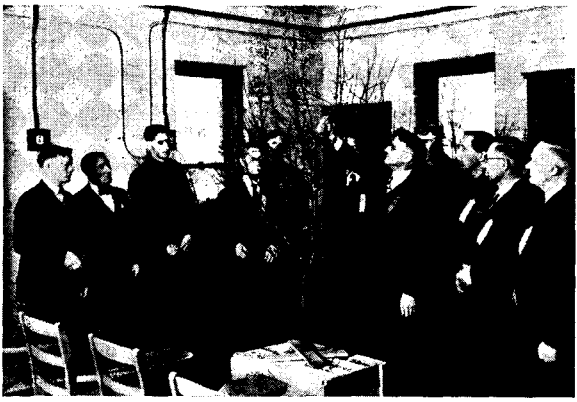
HORTICULTURE

March 27, 28, 29, 1940

Division of Horticulture

The popularity and usefulness of this course is shown by the fact that it has been given for nearly 20 years, with an attendance of from 300 to 400 persons each year.

It is divided into sections to meet the needs of vegetable growers, fruit growers, commercial flower growers and propagators, and amateur gardeners. Authoritative speakers, selected from the staff at University Farm, and practical growers bring up-to-the-minute reliable information on horticultural problems to those attending. Two or three guest speakers from outside the state complete the list of instructors.



Demonstration of Horticultural Practice

HYBRID CORN GROWERS

Not offered 1939-40

Division of Agronomy and Plant Genetics

This short course is given at the request of growers of hybrid seed corn and is intended to present information in regard to the various steps in breeding, introduction, production, and distribution.

ICE CREAM MANUFACTURERS

March 19, 20, 21, 1940

Division of Dairy Husbandry

The Ice Cream Short Course will interest men in various fields of the dairy industry. Those who are manufacturing ice cream on a large or small scale will find the material presented in this course of vital importance to their business. Likewise those who are interested in the manufacture and distribution of creamery equipment will find this course of particular interest. The general subject matter which will be covered will include pasteurization of ice cream mix, freezing of the ice cream mix, sanitary problems confronting the ice cream manufacturer, ingredients used in the ice cream mix, food value of ice cream, and defects in ice cream. In addition to the above, demonstrations will be presented on the making of fancy ice creams, tinting, and decorating. Fee: $5.

Demonstration in Making Fancy Ice Cream

POULTRY SHORT COURSE FOR FLOCK-SELECTING AGENTS

August—Write Short Courses Office for date

Division of Animal and Poultry Husbandry

This course, offered in cooperation with the Minnesota Poultry Improvement Board and the U. S. Department of Agriculture, is intended primarily to provide the special training needed by persons acting as flock-selecting agents and inspectors for hatcheries operating under the state and national poultry improvement plan. Instruction will emphasize culling for production and standard quality, but will also include subjects such as feeding, housing, and general management of poultry flocks.

Short Course Class in Poultry

REFRIGERATED LOCKERS

September 19, 20, 21, 1939

Divisions of Home Economics, Horticulture, Animal Husbandry, Agricultural Economics, and Veterinary Medicine

Intended primarily for cold storage locker operators and managers and established at their request, this course will offer authoritative information on the costs, possibilities and limitations of the cold storage meat locker industry, management problems, freezing of home garden products, preservation of fruits by freezing, use of frozen foods in the home, preparation of foods for the locker, hygiene and sanitation of meat locker establishments, as well as slaughtering and meat cutting demonstration. Fee: $3.

SWINE FEEDERS' DAY

October—Write Short Courses Office for date

Division of Animal Husbandry

The purpose of this meeting is to bring the swine growers of the state together at University Farm for a day so that they may get first hand the results of breeding and feeding experiments, hear and participate in discussions on subjects of importance to the swine industry, and at the same time enjoy a day of recreation. Everyone interested is invited to attend.

UNIVERSITY OF SCOUTING

July—Itasca State Park

Boy Scouts of America—Region Ten

The University of Minnesota and Region Ten of the Boy Scouts of America offer this opportunity to Scout councils to train men in Scout leadership methods under expert instructors, ideal conditions, and beautiful surroundings. The courses are designed to train men to be administrators, officers, and instructors in local council training courses.

All registered scouters are eligible to enroll for courses at the University of Scouting, including council presidents, executive board members, district chairmen, district committee members, chairmen and members of council and district leadership training committees, and all others who will serve in some capacity to help train other men through their local council training program.

The minimum age limit is 21 years. The University of Minnesota short course fee is $5; board,

Action Scene from Scouting Course

$8; and incidentals, $2; total cost, $15 for the entire period, including meals and all necessary notebooks, textbooks, and printed material. Courses offered include elements of scoutmastership; health and safety and first aid; principles of scout and cub leadership; scoutcraft specialization courses such as archery, wood carving, and leathercraft; University specialization courses such as forestry, plant and insect life, soil management, rocks and minerals, and conservation.

For further information, write to Boy Scouts of America, 1124 Minnesota Building, St. Paul.

VEGETABLE GROWERS

Not offered in 1939-40. May be given on request. Write Short Courses Office for information

Division of Horticulture

The purpose of the course is to enable persons who intend to follow the business of commercial vegetable growing to become better acquainted with agricultural science and its relation to the vegetable industry.

VETERINARY

June or July—Write Short Courses Office for date

Division of Veterinary Medicine

The Veterinary Short Course is given in cooperation with the semi-annual meeting of the Minnesota State Veterinary Medical Society and is intended for graduate licensed practitioners. Its purpose is to instruct veterinarians in the latest developments in the field in order that they may render a more efficient service to the animal industry. Subject matter to be covered will include phases of medicine and surgery and control of infectious diseases in horses, cattle, sheep, swine, and poultry.

WILDLIFE CONSERVATION

February or March—Write Short Courses Office for date

Division of Entomology and Economic Zoology

The course consists of lectures on the various phases of game and fish conservation and management given by outstanding specialists in these fields from the university, from the various federal

bureaus which deal with wildlife conservation, and from the state conservation department. The course is open to all and should be of particular interest to sportsmen, farmers, leaders of youth groups, and to those professionally engaged in conservation work, such as game wardens and wildlife technicians. Fee: $2.

NORTH CENTRAL SCHOOL AND STATION

Grand Rapids, Minnesota

Superintendent R. L. Donovan

4-H CLUB SHORT COURSE

June—Date to be announced

Attended annually by 300 to 350 4-H club members from northeastern Minnesota, the 4-H Club Short Course program includes class work, contests, and recreation. Boys are given instruction in dairy judging, cattle feeding, poultry culling, chick management, rope work, crops, gardening, home beautification, and other subjects. Included in the girls' program are classes in clothing, canning, and home furnishing. The regional contests in one-act plays and music are held at this time.

NORTHEAST EXPERIMENT STATION

Duluth, Minnesota

Superintendent Mark J. Thompson

ARROWHEAD INSTITUTE AND NORTHEAST MINNESOTA FARMERS' WEEK

April 1-4, 1940

Aimed to meet the needs of all people in northeastern Minnesota, the Farmers' Week program is arranged to bring them together for a regional conference at the beginning of the growing season. Instructional and social values are stressed and a well-rounded program of class instruction in all phases of agriculture and homemaking, including judging contests, demonstrations, and exhibits, is scheduled. Many Arrowhead farm groups hold meetings at this time. In addition, evening sessions feature plays, music, and other entertainment.

SUMMER CROPS DAY
August 17, 1939

This day, designed to follow seasonal progress on the growing condition of crops, comes just before the Fair season starts. This date is somewhat late for hay and only fair for grain, but is excellent for the fruit and tilled crops which are very important to this area.

NORTHWEST SCHOOL AND STATION

Crookston, Minnesota

Superintendent T. M. McCall

4-H-CLUB WEEK
June—Date to be announced

Four-H Club Week is a course for club members and leaders in northwestern Minnesota. Instruction and specific information on club projects are presented by specialists to give club members a broader understanding of the organization's project work and activities. Regional contests are held and a well-balanced recreational program offered.

WOMEN'S CAMP
June—Date to be announced

This course, intended for homemakers, is offered annually. It brings the latest and best information available on various phases of homemaking, such as foods and clothing, and includes a variety of topics on handicrafts and community service.

CROPS AND SOILS DAY
July—Date to be announced

One day is set aside each year for visitors to see the field results of variety and cultural tests of grain crops, potatoes, and sugar beets. The day preceding visitors' day has been given over as a field plots inspection day for county extension workers and agricultural high school instructors to give detailed first-hand information on the progress of experimental work.

RED RIVER VALLEY SHOWS AND NORTHWEST SCHOOL FARMERS' WEEK
February 5-9, 1940

With all farmers and homemakers invited to attend, this biggest of all events at the Northwest Station brings up-to-the-minute information on

agriculture and home economics. Specialists in various educational lines are featured on the 4-day program. Annual meetings of Red River Valley farm organizations are scheduled, and every evening an entertaining assembly is featured. There are judging contests and a complete livestock and crops show with a full list of premiums. That this week is popular among the northwestern Minnesota farmers and homemakers is evidenced by the 8 to 10 thousand who annually attend.

WEST CENTRAL SCHOOL AND STATION
Morris, Minnesota
Superintendent Theodore H. Fenske

4-H CLUB WEEK
June—Date to announced

This annual 4-H event is open to club members and leaders in west central Minnesota who are approved by their county agricultural agents. It is the aim of the course to give 4-H boys and girls an opportunity to obtain latest information regarding their project work, to provide training in leadership, and to give them an opportunity to meet members from other counties in recreational events.

HOMEMAKERS' SHORT COURSE
June—Date to be announced

The homemakers from the farms, villages, and cities of west central Minnesota are invited to attend this 3-day short course. It is given to provide homemakers with the latest ideas in home care and management and at the same time gives them an opportunity for rest and recreation.

LAMB FEEDERS' DAY
January—Date to be announced

This one-day program consists of reports of lamb-fattening experimental results and discussions of sheep production and management problems. Its purpose is to give first-hand information to lamb feeders and sheep raisers on subjects that are of importance to the sheep industry.

STATION AND VISITORS' DAY
July—Date to be announced

This day is set aside for visitors to see results of crops, soils, and livestock experiments being carried on at the West Central School and Station.

Farmers, farmers' wives, county agents, high school agriculture teachers, and all others interested in agriculture are invited to the Station for the day. Speakers of general interest are scheduled.

PERSONNEL IN CHARGE OF SHORT COURSES

Guy Stanton Ford—President, University of Minnesota

W. C. Coffey—Dean, College of Agriculture

L. A. Churchill—In Charge, Agricultural Short Courses

Advanced Creamery Operators—W. B. Combs, Division of Dairy Husbandry

Boys' and Girls' 4-H Club Week—T. A. Erickson, 4-H Club Department

Cattle Feeders' Day—W. H. Peters, Division of Animal Husbandry

Creamery Operators—W. B. Combs, Division of Dairy Husbandry

Dairy Farmers' Day—J. B. Fitch, Division of Dairy Husbandry

Editors' Short Course—H. L. Harris, Division of Publications

Farm Structures Conference—H. B. White, Division of Agricultural Engineering

Horticulture—W. H. Alderman, Division of Horticulture

Hybrid Corn Growers—H. K. Hayes, Division of Agronomy and Plant Genetics

Ice Cream Manufacturers—W. B. Combs, Division of Dairy Husbandry

Poultry Short Course for Flock-Selecting Agents—H. J. Sloan, Division of Poultry Husbandry

Refrigerated Lockers—S. T. Warrington, Division of Agricultural Economics

Swine Feeders' Day—W. H. Peters, Division of Animal Husbandry

University of Scouting—Kenneth G. Bentz, Boy Scouts of America, 1124 Minnesota Building, St. Paul

Veterinary—C. P. Fitch, Division of Veterinary Medicine

North Central School and Station Events—R. L. Donovan, Superintendent, Grand Rapids

Northeast Experiment Station Events—M. J. Thompson, Supe. intendent, Duluth

Northwest School and Station Events—T. M. McCall, Superintendent, Crookston

West Central School and Station Events—T. H. Fenske, Superintendent, Morris

The Bulletin *of the* University *of* Minnesota

Correspondence Study Courses Announcement for the Year 1939-1940

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GENERAL INFORMATION

CORRESPONDENCE STUDY

The last few years have demonstrated the effectiveness of university teaching by correspondence study. The foremost American universities have recognized this specific opportunity for educational service. In thus extending its functions, the University of Minnesota offers a plan of practical instruction whereby preparatory, vocational, and collegiate training is made available to those who of necessity must devote a part of their time to other duties. Teaching by correspondence study thus has become a part of the state educational system. It now is possible to contribute largely to the requirements for a Bachelor's degree by combining work in residence with correspondence study under the General Extension Division.

WHO MAY REGISTER

Correspondence study courses are open to all who are prepared to pursue them with profit. Students who expect to secure credit toward a university degree must, of course, satisfy all entrance requirements; in addition the prerequisites listed for each course must be met, at least in equivalents. But those who do not desire or expect such credit are permitted to register for any course in which they have an interest and sufficient preparation to enable them to do the work for the course. Students of this character are welcomed, and are given the same careful instruction and criticism as those who are candidates for a degree.

Students who have been dropped from the University or from any other college are not allowed to register in the Correspondence Study Department until they have been reinstated in the college from which they were excluded.

ADVANTAGES

The correspondence study method of study offers a number of advantages which make it particularly suited to the needs of the serious student, who is not able to take work in residence in any school, but who is interested in the mastery of a subject for purposes of credit or self-improvement.

The following advantages are apparent: correspondence study accommodates itself to a person's time schedule and personal conditions; it does not interfere with his vocational activities; it enables him to start a course at any time, to make use of his leisure moments, and to complete the course as rapidly as desired, within reasonable limits. By the correspondence study method the student concentrates upon one or two subjects, recites upon every part of every lesson, masters his material thoroly, and receives the individual attention of the instructor in his lesson reports. Correspondence study work involves skill in compassing the ideas of the study material; in arranging data for lesson papers; in thinking logically and in expressing one's self capably.

The writing of lesson reports helps the student to digest the significant points of a course, to put them into permanent form, and to make them accessible for future reference. The student's initiative, self-reliance, accuracy, and perseverance are increased by the correspondence study method. By this plan he may satisfy his special interests, prepare for special occupations, accumulate credits, or experience the thrill of mental and cultural growth.

THE INSTRUCTION

Upon the receipt of the application and fee for any course the first lessons are sent, together with instructions for the preparation of lessons and directions for making reports.

The teaching is done by professors from the various faculties in the University who are in continuous charge of similar courses in residence and who are familiar with the needs of nonresident students.

Each lesson assignment contains instructions, questions, references, and helps, so that the student may have accurate information regarding the ground to be covered.

Each lesson report is returned to the student with such corrections, explanations, and suggestions as may be needed. It is expected that these lesson papers will be carefully reviewed by the student for the purpose of avoiding errors in future lessons. Questions on any lesson point are welcomed.

COURSES AND LESSONS

Courses are divided into lesson assignments, varying in number from six to twenty-seven—the credits earned varying from one to five. These courses parallel the corresponding day courses in content, as well as in the number of credits allowed for them.

Each lesson is planned to consume about six clock hours of preparation time. The hope is that a student will finish at least one lesson per week, which will involve, therefore, one hour of work a day for six days. (See further remarks under Amount of Work Carried, page 10.)

SELECTION OF COURSES

In selecting courses for university credit, it is advisable that the student secure a copy of the bulletin of the college he expects to enter, so that he may conform to the prescribed course of study. Bulletins may be secured by addressing the registrar, University of Minnesota, Minneapolis.

BOOKS AND OUTFIT

All necessary textbooks, drawing outfits and apparatus *must be procured by the student. Do not send money to the University* for the purchase of texts and other materials. There will accompany the first lesson, instructions regarding texts and how to order them.

UNIVERSITY MATRICULATION

Admission to the schools and colleges of the University which accept students directly from the high school is either by certificate or by examination. Matriculation is completed with the registrar.

The applicant must present a certificate of graduation from an accredited preparatory school, or certificates showing that he has passed examinations in high school subjects previously given by the Minnesota State Board, or corresponding examinations in another state provided these examinations are recognized by the state university in that state. Certificates representing examinations given by the College Entrance Board or the Regents of the State of New York, are likewise accepted.

The University of Minnesota entrance requirements are described in detail in the General Information Bulletin to be obtained from the registrar.

A preparatory unit represents the equivalent of one year's work in a subject, for five classroom periods each week. Twelve units of senior high school work, selected from five specific groups, are required for entrance in any case; the particular requirements of the several colleges vary.

Then how can a student who has not sufficient entrance units enter the University? There are only three ways:

1. Obtain provisional admission by tests. Applicants for admission to the University who are high school graduates but who fail to meet the University's requirement with reference to specific subjects, and applicants who are not high school graduates but who are nineteen years of age or older may be admitted provisionally and subject to one year of satisfactory work at the University upon passing the following tests:

a. College aptitude test
b. Test of proficiency in English
c. Such special placement tests as the school or college to which the candidate desires admission may prescribe.

2. Obtain credits by passing the examinations of college entrance examination boards, given in various states.

3. The University does not grant a high school diploma for work done by correspondence study, but the Correspondence Study Department of the University can help a student to obtain entrance credits in three different ways:

a. If he is a high school graduate but lacks one or more of the required entrance credits, he may obtain the necessary credits by correspondence study.
b. If he has not completed high school and wishes to apply for entrance, correspondence study courses will help him prepare for the English test and placement test required of such applicants for admission.
c. With the permission of the high school concerned, correspondence study courses may be used to complete the requirements for high school graduation.

Whether or not a state teachers college will accept the entrance or preparatory credits obtained from this department and apply them toward a diploma, and the extent to which such credits will be accepted and applied, depends entirely upon the rules of the school concerned.

LIST OF PREPARATORY COURSES

Below is a list of the courses offered by correspondence study which may be taken for credit toward college entrance. Certain subjects, such as elementary courses in languages, may be taken *either for entrance or for college credit, but not for both;* a subject presented for entrance may not be repeated for college credit.

Group A: English
English Composition A, B, C, and D
English Literature A, B, C, and D

Group B: Languages
Courses marked with an asterisk under German, Romance Languages, and Scandinavian Languages.

Group C: History and Social Science
- American History A and B
- World History A and B
- Social Science A and B

Group D: Mathematics
- Algebra A and B
- Plane Geometry A and B
- Solid Geometry
- Higher Algebra

Group F:
- Elementary Bookkeeping
- (See Economics 1c, page 19)

LOAN LIBRARY FACILITIES

The student should first secure the assistance of his local library. Librarians are willing to co-operate, and will often secure a needed reference book, if future use will seem to justify such a purchase.

Some reference books may be borrowed from the University Library. Such loans are necessarily limited to books which are not at that time in use in classes. The library does not loan textbooks. *The period of loan is one month.* In case the book is urgently needed for university use it may be immediately recalled. The student is expected to pay express or postage both ways. Special book request blanks will be sent with the first lesson assignments of each course. These should be filled out carefully and mailed directly to the librarian, University of Minnesota, Minneapolis.

The State Department of Education operates a loan library service, through which students may obtain some reference books. This service is available only to residents of Minnesota living outside of Minneapolis and St. Paul. Application should be made to the Library Division, State Department of Education, State Office Building, St. Paul.

The General Extension Division operates a loan library service in connection with certain courses. A rental fee is charged for the service. Details of this plan will be furnished with the first lesson of the courses for which these reference books are available.

REGISTRATION PROCEDURE

The student who wishes to undertake correspondence study should first select such a course or courses as he may desire to take. He should then fill out in ink the application blank which has been sent to him and return it with the required fee to the Correspondence Study Department, University of Minnesota, Minneapolis. The student himself should fill out the blank.

HOW TO SEND MONEY

Payment should be made by post-office or express money order, personal check, or draft. *Make all checks and orders payable to the University of Minnesota.* The remittance should cover the exact amount of the fee.

SPECIAL CLUB AND GROUP SERVICES

The Correspondence Study Department offers special help in the form of club study programs, reading courses, group study by correspondence study, and courses acceptable for Extension Division certificates. Ask for further information.

ACTIVITIES OF THE GENERAL EXTENSION DIVISION

Extension or evening classes in the Twin Cities, Duluth, and other cities of Minnesota.

Correspondence study courses, available twelve months of the year.

Community Service Bureau: provides lectures, lyceum courses, concerts, entertainments: lends lantern slides and films for visual instruction; gives advice on selection and production of plays; operates a radio broadcasting station for educational purposes.

Municipal Reference Bureau: maintained for the benefit of municipalities of Minnesota and their officers; offers consultation service to city councils.

Short courses and special institutes.

AGRICULTURAL EXTENSION SERVICE

The Agricultural Extension Service includes the county agricultural agents, the home demonstration agents, and the 4-H Club agents working in the counties, as well as the subject-matter specialists working out of the state office. The purpose of the Agricultural Extension Service is to assist farm people in improving farm and home conditions through the adoption of improved practices in accord with plans of work prepared by their own groups. Various short courses are held by the College of Agriculture, Forestry, and Home Economics. For these services address the Agricultural Extension Division, University of Minnesota, University Farm, St. Paul, Minnesota.

REGULATIONS

NOTE OF CAUTION

All correspondence study students should give especial attention to the rules on time (see below); Reinstatement (p. 11); Refunds (p. 11); Transfer of Credits (p. 12); Examinations (p. 12).

ADMISSION

Correspondence study courses are open to anyone who can carry the work. A student who plans to work for a degree from the University of Minnesota and who has not matriculated as a regular student should have official copies of his high school and college credits sent directly to the registrar for examination. He will then be notified of his classification. He is not required to do this before enrolling for a correspondence study course altho it is advisable for him to do so.

No student registered in classes at the University of Minnesota or any other institution of learning may register for a correspondence study course without the approval of the proper authorities in that institution. The notice of such approval must be sent in writing to the Correspondence Study Department.

The department reserves the right to advise a student to change or discontinue a registration if it finds that the course selected is not for the best interests of the student. Whenever a registration is rejected or discontinued, the fee for the course is returned.

AMOUNT OF WORK CARRIED

Not more than two courses may be taken by correspondence study at one time.

The maximum number of lessons that will normally be accepted from a student is four per week. This rule holds regardless of whether one or two courses are being carried.

Correspondence study courses are included in the amount of work permitted students in extension classes. Accordingly, students pursuing both kinds of extension study should have their work approved by the students' work committee of the General Extension Division.

TIME

A student may begin a correspondence study course at any time, and should complete the course within one year from the date of enrolment. If the course is not completed within this limit the registration is considered expired. (See Reinstatement below.)

During the summer months the department cannot guarantee the prompt return of lesson papers. While instructors are on vacations their work may be carried by substitutes, or the work may be temporarily discontinued. In the latter case an extension of time for the completion of the course affected will be allowed.

The student should endeavor to send in at least one lesson report every week. If it is not possible to do this the department should be notified. Temporary delays are, however, unavoidable in a busy person's work, and

no student should become discouraged because of them. Each report should be sent in as completed, and not held until others are finished. The latter practice will cause delays in their return; and in addition, the instructor's corrections and criticisms will not be available before the student proceeds with advanced lessons.

PREPARATION OF LESSON REPORTS

Lesson reports, which are the evidence of the study given to assignments, must represent the student's own work. Success in the final examination, which is conducted under supervision, and on which credit for a course is finally based, will depend on the amount and quality of the student's work on all the lessons in the course.

REINSTATEMENT

Any student who has failed to complete a course within the prescribed time of one year, through causes not within the control of the University, may be reinstated with the consent of the department on payment of one dollar for each course and each year involved since the expiration of the registration. Such reinstatement holds for one year. Reinstatements for only two extra years will be allowed.

TRANSFER OF REGISTRATION

Any student may have the privilege of transferring his registration from one correspondence study course to another by the payment of a fee of one dollar. A transfer will be allowed only within three years from the date of registration. In case reports have been made on the lessons of the original course, a fee of sixty-five cents will be charged for each lesson completed. If the transfer is recommended by the department, no charge will be made.

A registration, or the fees therefore, may not be transferred to or from (a) extension classes, (b) any other division of the University, or (c) another person.

FEES

All fees are payable in advance. The fee for each course may be found following the description of the course.

POSTAGE

The student prepays postage on all mail sent *to* the University; mail sent *from* the University to the student is prepaid by the Correspondence Study Department.

REFUNDS

Two dollars of each fee is the non-refundable portion withheld to cover expenses of registration. *No fee will be refunded after two months* from the date of registration or after the student has completed one half of the course for which he has registered. If an application for instruction is rejected, the entire fee is returned. If lessons have been completed before the cancellation of a course, a charge of sixty-five cents for each lesson will be made in addition to the two dollars above mentioned.

CREDIT

Students who undertake correspondence study work for university credit should state this fact in advance and must comply with all requirements of the University, including the prerequisites for each course. Credits allowed in this connection will be recorded separately until the student matriculates at the University, when they will be recorded permanently as university credits.

Those seeking a university degree must conform to all the requirements exacted by the college or school in which such a degree is sought. The bulletin of any college or school may be obtained from the registrar.

A maximum of one half of the required credits for the bachelor of arts degree may be accumulated through correspondence study. The work of the earlier part of the curriculum is more likely to be available for correspondence study. A student working for a degree must earn at least one year's credit in residence in this University. If the term of residence is only one year, that year must be the senior year; and in any case he must spend two quarters of the senior year in residence. (Only three credits in a major sequence (courses numbered 50 or above) may be earned through correspondence study and applied toward a degree in the College of Science, Literature, and the Arts.)

The School of Business Administration (Senior College) accepts toward a degree only nine credits earned through correspondence credit. (See page 14 for full statement.) This limited number of credits does not apply to subjects listed in the prebusiness curriculum of the College of Science, Literature, and the Arts.

The *Institute of Technology* (see page 22) accepts only nine credits in technical subjects earned through correspondence study. This limited number of credits does not apply to academic courses such as English, mathematics, and drawing.

Entrance credit is allowed for courses of high school grade. See Preparatory Courses, pages 7-8.

No credits may be earned by correspondence study to apply on the Master's degree, or any other graduate degree. However, if probationary credits are demanded before a student enters the Graduate School, nine credits in the major or minor field may be earned by correspondence study. In this work a grade of B must be maintained.

TRANSFER OF CREDITS

Acceptance of credits transferred to another institution depends wholly upon the regulations of that institution. Students who expect to apply credits elsewhere should first make sure of the rules of the other school or college, and of the definition of credit in that school.

A University of Minnesota credit now means one fifty-minute classroom period per week for a "quarter," or twelve weeks. Three "quarter" credits are equivalent to two "semester" credits.

EXAMINATIONS

A student, on completing any course, will be given an examination either at the University, at the extension offices in Minneapolis, St. Paul, or Duluth, or under approved supervision. The supervisor must be the county superintendent of schools, the principal or superintendent of a public high school, or an official in a state school.

Success in the examination is requisite to credit.

Deferred examinations.—Examinations should be taken after preparation and immediately following the completion of the course. If taken any time before the expiration of the registration, there is no extra charge; after this expiration the regular reinstatement fee of one dollar will be charged.

GRADES AND HONOR POINTS

In addition to the recognition, by the use of *credits,* of the *amount* of work done, there is a further recognition of *quality,* through the use of *grades* and *honor points.* Four grades are employed: D is used on work of mediocre merit, which may be counted toward a degree only when averaged with work of higher grades in other courses; C indicates the quality of work acceptable for graduation; B and A are given to work of especial merit.

Work below D in merit is marked E (condition) or F (failure). A condition is a temporary grade, representing a deficiency which may be removed by a subsequent examination. The fee for this condition examination is one dollar. The final grade, however, may not be higher than C; *and unless the condition examination be taken within three months the grade becomes a failure.* A course in which a final grade of F has been received must be repeated before any credit is given.

RESIDENT STUDENTS

Registration for correspondence study courses will not be accepted from resident or extension class students of the University of Minnesota or of any other institution of learning unless specific permission is granted by the institution concerned.

No registration for a correspondence study course for the purpose of removing a condition or a failure will be accepted except upon the written consent of the proper authorities in the school concerned.

DESCRIPTION OF COURSES*

ANTHROPOLOGY

41. Introduction to Anthropology. Characteristics of the human races; fossil men; prehistory. The life of primitive peoples; economics, religious, social activities, and other phases of culture. The bearings of anthropology on present-day thought and problems.
    Twenty-seven lessons (five credits). $17.00. Mr. Mandelbaum.

ART EDUCATION

1. Fundamental Experiences in Design. A beginning design course, emphasizing structure and function. General design principles are applied to a series of interesting problems. Helpful as a basis for other art courses and for public school art teaching.
    Sixteen lessons (three credits). $10.00. Mrs. Lewis.
3. Interior Decoration. Design principles in relation to the home. Identification of period and modern furniture. Subjects discussed include wall treatment, floor coverings, color schemes, furniture arrangement, window treatment, and the use of accessories. Of interest to salespeople, homemakers, and decorators.
    Sixteen lessons (three credits). $10.00. Mrs. Lewis.

38,45. Application of Design to Needlecraft, and Elementary Weaving and Allied Crafts. A practical course in needlework and other textile crafts suitable for use in homes, schools, camps, playgrounds, and for those interested in adult education.
    Sixteen lessons (three credits). $10.00. Miss Ross.

ASTRONOMY

11. Descriptive Astronomy. A descriptive course designed to give accurate general information regarding the solar system and the stellar universe. It emphasizes the basic facts of the physical universe, rather than the technical details of the work of a professional astronomer. A small telescope or even a field glass will be helpful but is not essential.
    Twenty-seven lessons (five credits). $17.00. Mr. Luyten.

BUSINESS ADMINISTRATION

(For courses in other business subjects, see page 19, Economics.)

The number of credits that may be earned by correspondence study toward the bachelor of business administration degree is limited to nine. For work carried in the Correspondence Study Division a student will be granted "transfer" credit in the School of Business Administration, i.e., in the transfer of credits for application toward the bachelor of business administration degree surplus honor points will not be considered. A student enrolled in the School of Business Administration should consult his adviser before registering for a correspondence study course.

* The letter c appearing after the course number indicates that the particular course is not given in residence.

1c. Business English. A practical course for people in business or those preparing to enter it. The ways of developing effective letter-writing habits are analyzed and presented in a study of diction, grammar, and the mechanics of letter forms. Practice in writing the more common types of letters and criticism of their effectiveness.

Sixteen lessons (three credits towards extension certificate only). $10.00. Mr. Haga.

2c. Business Correspondence. Letters in general. Letters of adjustment, reminder, recommendation, and application. Collection, sales, and follow-up letters. Comments are given on psychological effectiveness of letters written by students. *Ability to use correct English is a prerequisite.*

Twenty-four lessons (four and one-half credits toward extension certificate only). $15.00. Mr. Haga.

†51. Business Law—Contracts and Agency. Contracts: Formation of contracts, the essentials thereof, the operation and interpretation of contracts. Agency: Methods of forming the relation and liabilities of agency.

The general rules of contracts being fundamental to all work in business law, this course must precede Business Law 52, 53, and 54.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

†52. Business Law—Partnerships, Corporations, and Bankruptcy. Partnerships: formation of partnerships and application of uniform partnership act. Joint stock companies; how distinguished from ordinary partnerships; how like ordinary partnerships; statutory requirements.

Corporations: formation, rights and liabilities. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

†53. Business Law—Sales, Bailments, Negotiable Instruments. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

54c. Business Law—Real Property, Mortgages. Classification of property, distinction between real and personal property; estates in land as to quantity, quality, and time of enjoyment; conveyances, mortgages and liens. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

58. Elements of Public Finance. Government expenditures, revenues, and debts. This includes a study of the nature of public expenditures, various kinds of non-tax public revenues, various forms of taxation, shifting and incidence of taxation, budgetary and legislative control, and fiscal reforms. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Borak.

59. Life Insurance. Nature, uses, and kinds of life insurance, and the fundamental principles involved in the measurement and underwriting of life risks. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Graves.

60. Fire and Marine Insurance. Nature of fire and marine risks and of the types of underwriters, forms of insurance contracts, analysis of policy provisions, and principles and methods of rate making. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Graves.

† No credit will be granted until all three courses are completed.

61. Casualty Insurance. Types of coverage which have been developed in this field; analysis of policy provisions and treatment of the important factors involved in the making of rates for each of these types of insurance. Prerequisites for credit: Principles of Economics I and II.
Sixteen lessons (three credits). $10.00. Mr. Graves.

69. Retail Store Management. A course in retail merchandising and store management. Lessons consist of discussions of actual problems encountered in retail stores, together with methods of studying and solving the problems. (A practical course for the active merchant.) Prerequisites for credit: Principles of Economics I and II, or equivalent.
Sixteen lessons (three credits). $10.00. Miss Canoyer.

76. Credits and Collections. A study of the nature and types of credit and credit instruments and agencies; qualifications and work of the credit manager; valuation and use of financial statements and credit reports; collection methods and correspondence; bankruptcy and adjustments; credit limits and control. Prerequisites for credit: Principles of Economics I and II.
Sixteen lessons (three credits). $10.00. Mr. Chute.
Registrations accepted after August 1, 1939.

86. Office Organization and Management. A general course dealing with (1) the place of the office in business, (2) functional analysis, (3) personnel, hiring, and training, (4) planning, production control, (5) standardization, (6) scientific management. Prerequisites for credit: Principles of Economics I and II.
Sixteen lessons (three credits). $10.00. Miss Donaldson.

88. Elementary Advertising. An elementary course in advertising emphasizing the retail point of view. This course discusses the economics of advertising, advertising and retail sales promotion, advertising media and technique. Prerequisites for credit: Principles of Economics I and II, or equivalent.
Sixteen lessons (three credits). $10.00. Miss Canoyer.

146. Investments. Study of the principles of investment and their application to actual cases. Lessons developed out of concrete examples to develop critical appraisal of specific securities and add to working knowledge of investment issues. Principal emphasis on the most important groups of securities—railroad, industrial, public utility, and governmental issues. Prerequisites for credit: Elements of Money and Banking and Corporation Finance. Recommended to business men to whom it is open without prerequisite.
Sixteen lessons (three credits). $10.00. Mr. Upgren.

155. Corporation Finance. A study of the organization and financial management of corporations, with reference to types of securities, conditions under which they should be issued, and facilities for marketing them. Prerequisites for credit: Principles of Economics I and II, and Elements of Money and Banking.
Sixteen lessons (three credits). $10.00. Mr. Stehman.

CHILD WELFARE

(Offered in co-operation with the Institute of Child Welfare.)

1c. Child Care and Training. Physical growth and care of young children. Mental development, personality, and behavior. The management of young children with reference to the establishment of desirable habits

of behavior. Play, toys, games, stories, and music. Intended primarily for the parents of young children.

Sixteen lessons (no credit). $1.00. Mrs. Cummings.

2c. The Older Child and Adolescent. This course follows the course in Child Care and Training. Physical, intellectual, and emotional development of older children. Influences on the personality of the child, his vocational and educational interests, his recreations and friendships discussed with a view to showing how they affect the process of growing up.

Sixteen lessons (no credit). $1.00. Mrs. Faegre.

40. Child Training. A brief study of the physical and mental development of the young child is followed by a discussion of the training of young children. Behavior problems in their various aspects, and the techniques of good and bad management will be considered. Prerequisites for credit: General Psychology I and II.

Sixteen lessons (three credits). $10.00. Mrs. Cummings.

50. The Guidance of Children's Interests. How the child's development may be furthered by directing his natural activities and interests. Stories, music, art, and dramatics, as well as the use of tools, toys, and a variety of occupational materials are discussed. The value of play and activities initiated and carried out by the children is stressed. Prerequisite for credit: Course 40.

Sixteen lessons (three credits). $10.00. Mrs. Cummings.

82. Later Childhood and Adolescence. What it means to grow up; the effect of physical, mental, and emotional growth on the developing personality; guidance of youth's interests and social life—sex, recreation, friends, and vocation. Prerequisites for credit: Course 40 or 80 or equivalent.

Sixteen lessons (three credits). $10.00. Mrs. Faegre.

CLASSICS

GREEK

†1. Beginning Greek I. The declensions and conjugations and the simpler rules of syntax together with translation of sentences from Greek into idiomatic English and from English into Greek.

Twenty-seven lessons (five credits). $17.00. Mr. Heller.

†2. Beginning Greek II. Course continued; general principles, inflections, word formations, syntax, elementary readings, composition. Prerequisite: Course 1.

Twenty-seven lessons (five credits). $17.00. Mr. Heller.

3. Beginning Greek III. Course continued. Prerequisite: Courses 1 and 2.

Twenty-seven lessons (five credits). $17.00. Mr. Heller.

56. Epic Poetry—Elementary Course in Homer. Selections from the *Iliad;* mythology, scansion, dialectical forms. Prerequisite: Course 14 or 15, or the equivalent.

Sixteen lessons (three credits). $10.00. Mr. Heller.

71. Dramatic Poetry—Elementary Course in the Drama. Euripides' *Alcestis* or *Medea;* translation, scansion, study of mythology and of Greek life. Prerequisite: Course 51 or 52.

Sixteen lessons (three credits). $10.00. Mr. Heller.

† Both courses must be completed before credit is allowed for either.

111. History—Herodotus. Selected readings from Herodotus' *History;* syntax, dialectical forms, the irregular verb; collateral work. Prerequisite for credit: Course 14 or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Heller.

LATIN

Students desiring to take courses for university credit should take Courses 1, 2, 3, and 9, or their equivalent, but should omit 10 and follow 9 by 11. Courses 1, 2, 3, and 9 satisfy the Junior College requirements in Latin.

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

1. Beginning Latin I. Inflections; translation of easy Latin prose; the study of elementary syntax; Latin composition.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
2. Beginning Latin II. A continuation of Course 1. Translation of selections from Eutropius; syntax; Latin composition. Prerequisite: Latin I or its equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
3. Caesar. Translation of the Campaign against the Belgians (Book II entire); and of the manners and customs of the Gauls and Germans (Book VI, chs. 9-29); syntax; composition; life of Caesar. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
9. Cicero I. Translation of the First and Second Orations against Catiline and of selected Letters; syntax; composition; life of Cicero. Prerequisites: Two years of preparatory Latin or Course 3.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
10. Cicero II. Translation of the Oration for the Manilian Law (the equivalent of two orations) the Archias, and the Marcellus; syntax; composition. Prerequisite: Course 9.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
11. Vergil's *Aeneid* I. Translation and interpretation of Books I and II of the *Aeneid;* syntax; principles of Latin versification; life of Vergil. Prerequisites: Three years of preparatory Latin or Course 9.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
12. Vergil's *Aeneid* II. Translation of Books IV and VI of the *Aeneid;* a very brief consideration of Vergil's influence. Prerequisite: Course 11.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
21. Livy. Translation of Book I; syntax, life, and literary style of Livy. Prerequisites: Four years of preparatory Latin or Course 12.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.
23. Roman Comedy. Translation of the Menaechmi of Plautus and the Phormio of Terence; syntax, literary styles of Plautus and Terence; outline of the history and technique of Roman drama. Prerequisite: Course 21.
Twenty-four lessons (four and one-half credits). $15.00. Mr. Cram.

ECONOMICS

PREPARATORY COURSES

1c. Bookkeeping. This course should prepare the student to keep books of account; to balance, adjust, and close such books; to prepare financial statements. It also provides the groundwork for the beginning accounting course in the college department, altho it is not a required prerequisite.

Twelve lessons (one-fourth entrance unit). $7.50. Mr. Lund.

COLLEGE COURSES

3. Elements of Money and Banking. An introduction to the study of modern financial institutions; the nature and functions of money, its types and methods of control; recent efforts to change and regulate the value of money; chief emphasis upon the American financial system, including the mechanism of the money market, investment banking, the functions of trust companies, savings institutions and commercial banks, the federal reserve system including recent modifications, and agricultural credit institutions.

Twenty-seven lessons (five credits). $17.00. Mr. Myers.

†6. Principles of Economics I. A course dealing with the underlying principles affecting the production and exchange of goods and services. Organization and regulation of production; the determination of costs and prices under conditions of competition and monopoly and public control of industry.

Twenty-seven lessons (five credits). $17.00. Mr. Graves

†7. Principles of Economics II. A continuation of Principles of Economics I. Financial organization of society; the distribution of wealth and income; the economic significance of labor organization; labor legislation; socialism; taxation; foreign trade. Prerequisite: Principles of Economics I.

Twenty-seven lessons (five credits). $17.00. Mr. Graves.

20. Elements of Accounting. The principles and methods of keeping records; form and content of the financial statements; debit and credit; journals; ledgers; use of special books; trial balance; adjusting and closing entries; the preparation of financial statements. Discussion of principles with use of a text and the working of a number of accounting problems for each assignment.

Sixteen lessons (three credits). $10.00. Mrs. Youngs.

58. Elements of Public Finance, page 15.

155. Corporation Finance, page 16.

161. Labor Problems and Trade Unionism. Deals primarily with the labor problem in the United States. Special attention is given to current problems such as unemployment, technological and cyclical; unemployment insurance and workmen's compensation; structure, aims, policies, and methods of trade and industrial unions and employers' associations; labor legislation relating to injunctions, yellow-dog contracts, strikes, and boycotts. Prerequisites for credit: Principles of Economics I and II, or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Schmidt.

TEXTILES

(See page 34.)

† Courses 6 and 7 must be completed before credit will be allowed for either.

EDUCATION

NOTE.—See Courses 1 and 2 under Psychology.

1c. Visual Aids. A practical course in the solution of problems encountered in the selection, use, and administration of equipment and materials in a visual education program for schools. Material covered will include the theory and mechanics, operation, and maintenance of equipments employing projection (lantern slide, opaque, combination, film strip, sound film slide, silent and sound motion picture projectors). Information on screens, window darkening material, etc., will be included. Problems in the selection of materials will be based specifically on the subjects taught by the registrant, e.g., biology for biology teachers, etc.

Sixteen lessons (three credits). $10.00. Mr. Jensen.

Registrations accepted after August 1, 1939.

*51A. Introduction to Secondary School Teaching I (Educational Psychology). A survey of the fundamental facts of human nature involved in educational activities. Psychological and educational measurements, learning, factors related to efficiency of learning, personality, and problems of adjustment. Prerequisite: Psychology I and II.

Sixteen lessons (three credits). $10.00. Mr. Lovegren

*51C. Introduction to Secondary School Teaching III (The High School). A comprehensive study of the modern secondary school. Origin and growth of secondary education, comparisons with modern European secondary schools, the student body, aims and objectives, present status and types of organization, the relation of the secondary school to mores and attitudes, the secondary school as a social institution, the teacher's place in the social and economic order, the program of study and activities, classification and guidance, and certain administrative features. Prerequisites: Psychology I and II and five credits in Education.

Sixteen lessons (three credits). $10.00. Mr. Wesley.

54(Agr.Ed.). Rural Education and Community Leadership. The organization and administration of a progressive program of rural education. Problems involving the school plant, the curriculum, the teachers, and guidance for rural youth. The school as a community center; organizing educational, social, and recreational activities. The objectives, organization, and operation of youth programs, clubs, fairs, festivals, and the many other desirable educative features of rural community life.

Sixteen lessons (three credits). $10.00. Mr. Field.

Registrations accepted after September 1, 1939.

60. Introduction to Statistical Methods. A study of elementary statistical methods. The commonly used statistical terms and methods are covered in this course. Prerequisites: 6 credits in psychology.

Sixteen lessons (three credits). $10.00. Miss Wilder.

*61A. Introduction to Elementary School Teaching I (Educational Psychology). A survey of fundamental facts of human behavior involved in educational activities. This survey includes the following topics: psychological and educational measurements, habit formation, transfer of training. Prerequisites: Psychology I and II.

Sixteen lessons (three credits). $10.00. Mr. Lovegren.

* This course is part of a three-quarter sequence in the College of Education, credit for which is granted only when the complete sequence is taken and student has passed the qualifying examination. See the Bulletin of the College of Education.

67. Junior High School. A study of the origin and growth and the special purposes of this institution and of the appropriate reorganization to achieve those purposes, including the organization and content of the curriculum, provisions for individual differences, advisory system, social organization (extra-curricular activities), methods of teaching, departmentalization, promotion, staff, plant, etc. Comparisons with secondary schools of Europe. This course may be substituted for Ed. 167 in undergraduate curricula. Not open to those who have had Introduction to Secondary School Teaching III. Prerequisites: Psychology I and II and five credits in Education.

    Sixteen lessons (three credits). $10.00. Mr. Wesley.

69. Extra-curricular Activities. Consideration is given to developing guiding principles of pupil participation in the extra-curricular phase of school life. Purpose of extra-curricular activities; membership in clubs; meetings and programs; officers of organizations; financing extra-curricular activities; student government; publications and journalistic organizations; social, moral leadership and guidance clubs. Prerequisites: ten hours in Education including Education 51a.

    Sixteen lessons (three credits). $10.00. Mr. Carlson.

Ed.73. Educational Sociology. General sociological principles and their application to the schools; the study of the community and the adjustment of the teacher to varying types of communities; factors in the development of personality and the relation of personality to the larger social group; a systematic survey of educative aspects of the home, church, recreation, industry, and community, as well as of the school; the problems of the place of education in social progress and the varying viewpoints.

    Sixteen lessons (three credits). $10.00. Mr. Wesley.
    Registrations accepted after September 1, 1939.

81. Historical Foundations of Modern Education. The history of education in ancient and medieval times. The study includes the development of educational theories and practices among the Greeks and the Romans and the ancient Hebrews and during the Middle Ages and ends with the recovery of the classical heritage in the sixteenth century. Textbook assignments and supplementary readings. This course may be substituted for Ed. 101 in undergraduate curricula. Prerequisites: six credits in psychology.

    Sixteen lessons (three credits). $10.00. Miss Alexander.

82. History of Modern Secondary Education. A historical study of secondary schools in western Europe and America in modern times, including such topics as the revival of classical learning; the reorganization of secondary schools in the sixteenth century; the rise of scientific inquiry; types of secondary schools in England, France, and Germany; the American Latin grammar school and academy; the rise of the high school. Textbook assignments and supplementary readings. This course may be substituted for Ed. 102 in undergraduate curricula. Prerequisites: six credits in psychology.

    Sixteen lessons (three credits). $10.00. Miss Alexander.

†83. History of Modern Elementary Education. Theory and work of the great educators, such as Comenius, Pestalozzi, Herbart, and Froebel; the rise of state school systems in Germany, France, England, and the United States; the development of the common school and of educational practices. Textbook assignments and supplementary readings. This course may be substituted for Ed. 103 in undergraduate curricula. Prerequisites: six credits in psychology.

Sixteen lessons (three credits). $10.00. Miss Alexander.

120. Basic Principles of Measurement. Principles of measurement applied to the construction, administration, and interpretation of educational and psychological tests. The course will involve the construction of achievement tests in the student's particular field of teaching. Prerequisite: Introduction to Statistical Methods.

Sixteen lessons (three credits). $10.00. Mr. Cook.

Registrations accepted after August 1, 1939.

INSTITUTE OF TECHNOLOGY

The Institute of Technology embraces the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy. (See page 12 for information concerning credits.)

ENGINEERING

MECHANICAL DRAWING

1. Engineering Drawing. Elements of drafting including methods of representation, geometry, lettering, sketching, dimensioning, and working drawings. Prerequisite: Solid Geometry.

Sixteen lessons (three credits). $10.00. Mr. French.

2. Engineering Drawing. Sections, auxiliary views, conventions, standards, tolerance dimensioning, working drawings, tracing. Prerequisite: Drawing 1.

Sixteen lessons (three credits). $10.00. Mr. French.

44. Freehand Lettering. Practice in freehand commercial Gothic lettering as used by draftsmen and engineers and in offices, stores, hospitals, libraries, schools, etc.

Six lessons (one credit). $5.00. Mr. French.

GENERAL ENGINEERING

70. Slide Rule. Practical course for engineers and office workers. Position of decimal point in computations stressed.

Six lessons (one credit). $5.00. Mr. French.

MATHEMATICS

For additional credit courses in mathematics see pages 37-38.

1c. Shop Mathematics I. Arithmetic from fractions through proportion. Problems in areas, volumes, weights of materials, screw threads and gear. Practical man's course. Also, valuable for the teacher who is preparing to teach applied mathematics under the Smith-Hughes Act.

Sixteen lessons (no credit). $10.00. Mr. Edwards.

† Not open to those who have had History of Education 71 (Brief Course in History of Education).

2c. Shop Mathematics II. Logarithms, algebra, and geometry from a shop standpoint. Practical problems.
Sixteen lessons (no credit). $10.00. Mr. Edwards.

9c. Higher Algebra. Review of elementary algebra, linear equations, determinants, ratio and proportion, variation, quadratic equations, graphs, progressions, binomial theorem. Prerequisite: one year of elementary algebra.
Twenty lessons (one-half entrance unit). $12.50. Mr. Priester.

10c. Solid Geometry. Standard theorems and exercises. Practice in special proofs and original exercises to develop imagination and initiative. Prerequisite: one year of plane geometry.
Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

NOTE.—Courses 9c and 10c meet the entrance requirements in mathematics of the Institute of Technology.

11. College Algebra. Theory of quadratic equations, interpretation of complex results, graphical representation, indeterminate equations, ratio, proportion, variation, progressions, series, undetermined coefficients, binomial theorem, logarithms, theory of equations, Horner's method. Prerequisite: Course 9c.
Twenty-seven lessons (five credits). $17.00. Mr. Priester.

12. Trigonometry. Graphical representation of functions, computation by logarithms. Trigonometric functions, plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, DeMoivre's theorem, spherical right triangles. Prerequisite: Course 11.
Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

13. Analytical Geometry—Plane and Solid. Co-ordinate systems, locus and equation, straight line, circle, parabola, ellipse and hyperbola. Transformation of co-ordinates and simplification of equations. Polar co-ordinates, higher plane curves, tangents, normals. Prerequisites: Courses 11 and 12.
Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

24. Differential Calculus. Discussion of limit and continuity of a function, derivative of algebraic and transcendental function. Simple application of derivatives, maxima and minima, differentials, rates, velocities and acceleration, radius of curvatures. Law of the mean, indeterminate forms, partial differentiation, series. Prerequisites: Courses 11, 12, and 13.
Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

25. Integral Calculus. Integration of standard elementary forms, definite integral, rational fractions, integration by substitution, by parts, reduction formulas, application to areas, surfaces, and volumes. Use of integral tables. Prerequisite: Course 24.
Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

MECHANICS

1c. Elementary Mechanics. Short practical course in elementary mechanics for those who have not had calculus. Numerical and simple graphical calculations of the action of forces on machines. Components of forces; analysis of stresses in simple structure; centroids and moments of inertia

of plane areas. Prerequisites: Shop Mathematics I and II or Trigonometry.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Priester.

26. Technical Mechanics: Statics. Characteristics of a force, parallelogram law, moments, couples, resultant of a force system, equilibrium of a force system, friction, centroids, moments of inertia, catenary. Prerequisite: Integral Calculus.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

127. Technical Mechanics: Dynamics. Force, mass acceleration, translation and rotation, gyroscope, governors, work, energy, power, conservation of energy, impulse, momentum, loss of kinetic energy, conservation of momentum. For those who wish to apply the principles of dynamics and kinematics to engineering problems. Prerequisite: Technical Mechanics: Statics.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

128. 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. Prerequisites: Courses 25 and 26.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

AERONAUTICAL ENGINEERING

1c. Elementary Aeronautics. This course offers the basic principles of aviation in an elementary way. History of aviation; the airplane and its parts; principles of aerodynamics; theory of flight; airfoils, slots, and flaps; aerodynamic resistance; stability and control; aircraft engine operation; propellers; flight maneuvers; aircraft construction; seaplanes and flying boats; military and commercial aircraft applications; radio; accessories; instruments. No prerequisite of mathematics is required altho a knowledge of high school algebra will be helpful.

Sixteen lessons (no credit). $10.00. Mr. Barlow.

CIVIL ENGINEERING

1c. Elementary Structural Steel Design. An introductory course covering the analysis of simple structures and their design. Algebraic and graphical methods of analysis of the treatment of dead, live, and moving loads; the design of simple tension and of compression members, beams, girders, and riveted and welded connections. Application of these principles is made to roof and bridge trusses. While this course is a complete unit, it would be advisable for the student to follow up his work by taking Courses 2c or 5c or both. Prerequisites: Mechanics 26 and 128, or satisfactory evidence of ability to do the work of this course.

Sixteen lessons (three credits). $10.00. Mr. Wise.

2c. Steel Bridge Design. A course in the theory and practice of the design of statically determinate bridges. Stress analysis of parallel and curved chord trusses, trusses with subdivided panels, K-trusses, Whipple trusses, cantilevers, three-hinged arches, and skew trusses; and of the design of floor systems; riveted and pin-connected trusses; lateral and sway bracing; portals and end bearings. Prerequisite: Elementary Structural

Steel Design or its equivalent. Courses 1c and 2c should provide a satisfactory elementary training for draftsmen, mechanics, and others who desire to enter the field of bridge design.

Sixteen lessons (three credits). $10.00. Mr. Wise.

5c. Steel Building Design. A course in the theory and practice of the design of the structural steel framework of buildings—shop, factory, office buildings, and warehouses. The various systems of framing, and connections, balconies, roof framing, footings, fire protection and erection. Prerequisites: Elementary Structural Steel Design or equivalent. Courses 1c and 5c should provide a satisfactory training for draftsmen, mechanics, and others who wish to obtain a start in building design work. Equivalent to lecture portions of C.E. 33 and 38.

Sixteen lessons (three credits). $10.00. Mr. Wise.

46c. Plain Concrete. Properties of concrete and concrete materials. Subjects discussed include portland cement, special cement, aggregates, proportioning, mixing, placing, field control, admixtures, durability, volumetric changes, tests and testing procedure, cold weather construction, etc. Prerequisite: knowledge of arithmetic.

Sixteen lessons (three credits). $10.00. Mr. Hughes.

49c. Advanced Reinforced Concrete Design. A course intended for civil engineers who are thoroly familiar with elementary reinforced concrete design. It takes up in detail the exact design of continuous beams and rigid frames as applied to reinforced concrete structures, the theory and design of flat slabs, and of retaining walls, footings and mat foundations by the more exact methods based on recent studies in the elasticity and strength of materials. Prerequisite: Satisfactory evidence of familiarity with elementary reinforced concrete design.

Sixteen lessons (three credits). $10.00. Mr. Wise.

ELECTRICAL ENGINEERING

1c. Direct Current Machinery I. An elementary study of magnetism and electricity. Simple laws of magnetism, and the relation of magnetism to direct current electricity are developed. Series and parallel circuits, and combinations of both, simple wiring and armature winding are taken up. Prerequisites: Elementary Algebra A and B.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Edwards.

MECHANICAL ENGINEERING

1c. Steam Power Plants I. A course for boiler operators. Combustion; coal; firing methods; boiler construction and fittings; power and care of boilers; pipes and pipe covering; steam tables.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Martenis.

NOTE.—For those engaged in boiler room work and who may wish to take an examination for a chief engineer's license, Shop Mathematics, Course 1c is of the utmost importance.

2c. Diesel Engines. A study of stationary and mobile Diesel engines from an engineering standpoint. Fundamental engine mechanisms, pistons, connecting rods, valves, cylinder heads, Diesel fuels, fuel pumps, and

injection systems; combustion chambers and combustion systems. Details of modern Diesel engines. Engine operation, analysis of engine troubles, engine repairs. Prerequisites: Elementary Mechanics and Trigonometry or permission of instructor.

Sixteen lessons (no credit). $10.00. Mr. Robertson.

3c. Elementary Air Conditioning. A course arranged to present the fundamentals of air conditioning to those interested in designing, installing, selling, or recommending the modern type of appliances for heating, cooling, humidifying, or otherwise conditioning the air for residences and other buildings. The subject-matter of this course deals with the comfort conditions of the human body; the laws of temperature, pressure, humidity, etc.; calculation of heat transmission losses and heating loads; calculation of cooling loads including sensible heat load, effect of solar radiation, and latent heat load; humidification and dehumidification; air distribution and air motion; air duct design including pressure losses, friction losses, size of ducts, air velocities, and duct construction. Prerequisite: Beginning Algebra or permission of instructor.

Sixteen lessons (three credits). $10.00. Mr. Algren, Mr. Jordan.

6c. Heating and Ventilating. The principles and installation of heating and ventilating apparatus. Introduction and study of heat; heat losses; ventilation practice; air conditioning; heating systems of various kinds; piping systems; central station heating; and heating accessories.

Sixteen lessons (three credits). $10.00. Mr. Martenis.

16c. Refrigeration. A comprehensive study written in style that can readily be understood. Study of heat; cooling processes; principles of refrigeration; refrigerants; compression and absorption; systems; automatic and domestic machines; theory of refrigeration; heat insulation, ice-making; cold storage; air conditioning; brine systems and piping; prime movers; economics of refrigeration; problems in refrigeration.

Sixteen lessons (three credits). $10.00. Mr. Martenis.

ENGLISH

PREPARATORY COURSES

1. English Composition A. This course, and the three following, are suited to the needs of those persons who do not have a good foundation in English, and hence need training in the correct use of the language. It covers that part of the work in composition usually given in the freshman year in high schools. It gives practice in writing compositions on simple subjects, with special attention to the development of sentence structure and a unified paragraph; special drill to overcome errors in grammar, spelling, punctuation, etc.; training in the use of the dictionary.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

2. English Composition B. This course is a continuation of the work of the first year, and covers the equivalent of the sophomore work in composition in high schools. Prerequisite: Course 1 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

3. English Composition C. This course is a continuation of Courses 1 and 2, but it is more advanced and presupposes the ability to do more thoughtful work, as it covers the composition work of the junior year of the high school. Composition forms a large part of the course. In it emphasis is

placed on gathering material and organizing it into longer themes than those of the first year. Drill in spelling, punctuation, etc. Includes more difficult points than those covered in the first year. Prerequisites: Courses 1 and 2 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

4. English Composition D. This course is a continuation of Course 3, and corresponds to high school senior English composition. Prerequisites: Courses 1, 2, and 3 or their equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

5. English Literature A. The object of this course is to arouse in the student an interest in the reading of good literature and to assist him to a knowledge and appreciation of some of the masterpieces in the various forms of literature. It includes the study of a volume of short stories, a volume of poetry, Shakespeare's *Merchant of Venice,* and Scott's *Ivanhoe.* The reading of an additional volume of each type is required of the student and questions are used to assist as well as to test his understanding of the works read. The course corresponds to the literature part of high school freshman English.

Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

6. English Literature B. The aim of this course is similar to that of English Literature A but the material studied is more difficult and the standard of work higher. The works studied are Poe's *Tales,* Shakespeare's *Julius Caesar,* Dickens' *Tale of Two Cities,* Lowell's *Vision of Sir Launfal,* and Coleridge's *Rime of the Ancient Mariner.* Outside reading from literature of each type is also required. This course corresponds to the literature part of high school sophomore English. Prerequisite: Course 5 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

7. English Literature C. This is a course in American literature. The works of well-known American authors, including those of recent date, are studied according to type rather than in chronological order. Some knowledge of the authors' lives as well as of their works is required. The course corresponds to the literature half of high school junior English. Prerequisites: Courses 5 or 6 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

8. English Literature D. This course, which corresponds to high school senior English literature, consists of a chronological study of the outstanding writers of English literature, their chief works and the periods in which they lived. It aims to establish standards of appreciation for the student's later reading, and to stimulate him to further reading of good literature. Prerequisites: Courses 5, 6, and 7 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

COLLEGE COURSES

Literature

†1. Freshman Literature I. Intended for students who have had work in composition equivalent to that of English A-B-C, but who have not had the study of English classics included in that course. This course carries

† No credit toward graduation is allowed for Freshman Literature I, II, and III until Composition IV, V, and VI are also completed.

university credit for the work in literature of English A. It includes a study of the drama as illustrated by Shakespeare's *Henry IV*, Part I, *Romeo and Juliet*, and several plays of modern dramatists.

Sixteen lessons (three credits). $10.00. Miss Grandy.

†2. Freshman Literature II. This course carries university credit for the work in literature (prose writers) of English B. It includes a study of the works of Macaulay, Huxley, Newman, and Stevenson.

Sixteen lessons (three credits). $10.00. Miss Grandy.

†3. Freshman Literature III. This course carries university credit for the work in literature of English C. It includes a study of various types of poetry from early ballads to dramatic monologs and free verse.

Sixteen lessons (three credits). $10.00. Miss Grandy.

*21. Introduction to Literature I. An intensive study of the leading writers of poetry and prose and of their historical background. The entire course of three terms begins with Marlowe and ends with Arnold. A knowledge of English history from Elizabeth to Edward VII is required. The first term includes Marlowe, Spenser, Bacon, Browne, Milton, Bunyan, and Dryden. Prerequisites for credit: Composition 4, 5, 6.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

*22. Introduction to Literature II. A continuation of 21. Addison and Steele, Swift, Pope, Fielding, Johnson, Boswell, and Sheridan.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

*23. Introduction to Literature III. A continuation of 22. Wordsworth Lamb, Byron, Shelley, Keats, Carlyle, Browning, and Arnold.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

†31. The English Novel I. The development of the novel from Defoe to Scott. Emphasis on the reading of a number of important novels and excerpts from others, supplemented by biographical and literary information obtained from a textbook and from one of the ordinarily accessible encyclopedias. The following novels are read: *Robinson Crusoe, Joseph Andrews, Humphry Clinker, Evelina, Pride and Prejudice,* and *The* Heart of Midlothian. Prerequisites: Composition 4, 5, 6, or exemption.

Sixteen lessons (three credits). $10.00. Mr. Mallam.

†32. The English Novel II. Method as in Course 31, except that no excerpts will be read. The reading consists of *Bleak House, Vanity Fair, Jane Eyre, Wuthering Heights, Adam Bede, Barchester Towers, Mary Barton, Richard Feverel.* Prerequisites: Composition 4, 5, 6, or exemption, and English Novel I.

Sixteen lessons (three credits). $10.00. Mr. Mallam.

33. Later English Novel. The course covers ten of the masterpieces of English fiction written in the last fifty years—*Tess of the D'Urbervilles* by Hardy, *The Way of All Flesh* by Butler, *The Master of Ballantrae* by Stevenson, *Lord Jim* by Conrad, *The Old Wives' Tale* by Bennett, *The Man of Property, In Chancery,* and *To Let* by Galsworthy, *Tono Bungay* by Wells, and possibly one novel by a later writer. Prerequisites: Composition 4, 5, 6, or exemption.

Sixteen lessons (three credits). $10.00. Mr. Mallam

* Students must take either 21 and 22 or 22 and 23 to receive credit. Two quarters are required as a prerequisite for a major sequence; the second and third quarters are required for a teacher's certificate.

† No credit toward graduation is allowed for Freshman Literature I, II, and III until Composition IV, V, and VII are also completed.

†55. Shakespeare I. Shakespeare's development as a dramatist. A careful study of the Comedies. Prerequisites: Composition 4, 5, 6, and six additional credits in English.
Sixteen lessons (three credits). $10.00. Mr. Nichols.

†56. Shakespeare II. A continuation of Course 55, with emphasis on Tragedy.
Sixteen lessons (three credits). $10.00. Mr. Nichols.

†73. American Literature I. A survey of American literary development in the seventeenth, eighteenth, and early nineteenth centuries. Prerequisites for credit: Composition 4, 5, 6, and six additional credits in English.
Sixteen lessons (three credits). $10.00. Mr. Nichols.

†74. American Literature II. A continuation of 73. A survey of American literary development from Hawthorne to the end of the nineteenth century.
Sixteen lessons (three credits). $10.00. Mr. Nichols.

Composition

NOTE.—All lesson reports in English composition must be returned to the Correspondence Study Department before credit will be allowed for a course.

A. Subfreshman Composition. A course in the simple fundamentals of correct English, intended to give additional drill to high school graduates who need further preparation for college English.
Twelve lessons (no credit). $7.50. Mrs. del Plaine.

4. Composition IV. Practical training in the art of writing, the principles of structure, and analysis of specimens of good prose. Practice in writing papers, most of them expository. Composition 4, 5, 6 fulfill the freshman English requirement.
Sixteen lessons (three credits). $10.00. Mr. Clark.

5. Composition V. Continuation of Course 4. This is the second quarter of the required work in English. It includes careful study of the paragraph and further work in theme writing. Prerequisite for credit: Composition 4.
Sixteen lessons (three credits). $10.00. Mrs. McFadyen.

6. Composition VI. Continuation of Course 5. Study of diction, and practice in writing exposition and narration. Completion of this course satisfies the university requirement in English composition. Prerequisites for credit: Composition 4 and 5.
Sixteen lessons (three credits). $10.00. Mrs. McFadyen.

†27. Advanced Writing I—Exposition. Study and writing of essays with emphasis on structure and organization. Prerequisites for credit: English A-B-C or Composition 4, 5, 6, or exemption from requirement.
Sixteen lessons (three credits). $10.00. Mr. Mallam.

†28. Advanced Writing II—Narration and Description. Study of principles of description and narration with analysis of specimens and exercises in writing. Prerequisite for credit: Advanced Writing I.
Sixteen lessons (three credits). $10.00. Mr. Mallam.

†69. Short Story Writing I. A study of short story technique with careful analysis of typical stories. Exercises in plot, setting, and characterization. Prerequisites for credit: Composition 4, 5, 6, 27, and 28.
Sixteen lessons (three credits). $10.00. Mr. Briggs.

† Parts I and II must be completed before credit will be allowed for either.

†70. Short Story Writing II. A continuation of Short Story Writing I, with analysis of stories and emphasis upon the student's completion of several stories of his own composition. Prerequisite for credit: Short Story Writing I.

Sixteen lessons (three credits). $10.00. Mr. Briggs.

80c. Independent Writing. Specifically designed for the student who neither needs nor desires the formal restrictions of a traditional composition course. The student is given complete freedom. The instructor will criticize any writing which the student submits and will offer individual suggestions for study and reading calculated to aid the writer in his particular problems. No prerequisites; but mastery of the fundamentals of composition is assumed. It is to the student's advantage that he submit a sample of his writing for the approval of the instructor before actually registering for this course.

Sixteen installments of a total of approximately 15,000 words (no credit). $10.00. Mr. Avery.

86. Versification I. A study of the nature of poetry, and a detailed analysis of English meters and the various English verse forms. Theory accompanied by criticism of poetry and practice in writing verse. Prerequisites: Composition 4, 5, 6, and six additional credits in English.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

87. Versification II. A continuation of Course 86. Prerequisite for credit: Course 86.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

ESPERANTO

1. Beginning Esperanto. Grammar and simple composition. The course aims to give the student sufficient knowledge of elementary Esperanto to enable him after a few months' study to read, write, and speak simple Esperanto. A feature of the course will be an early correspondence with foreign Esperantists.

Sixteen lessons (no credit). $10.00. Dr. Wendell.

2. Advanced Esperanto. A continuation of Course 1. Designed for those who wish to write and speak Esperanto, not merely sufficiently well to be understood, but in good style. The student will continue to correspond, and will do more original work in connection with a study of the best Esperanto literature, in order to acquire the style and elegance of expression which the language, like national languages, has in its own way. Prerequisite: Course 1.

Sixteen lessons (no credit). $10.00. Dr. Wendell.

GEOLOGY

8. Introductory Geology. An introductory treatment of the materials of the earth and of geologic processes; principles of earth sculpture, glaciation, volcanic activity, mountain building, etc., as a key to the interpretation of the surface features and the history of the earth. No prerequisites.

Twenty-seven lessons (five credits). $17.00. Mr. Thiel.

† Parts I and II must be completed before credit will be allowed for either.

GERMAN

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

*1. Beginning German I. Grammar and easy composition. The course aims to give the student a knowledge of the elements of German grammar, the facility to read easy German, and to write simple German sentences.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*2. Beginning German II. A continuation of Course 1. Prerequisite: Course 1.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*3. Beginning German III. Grammar and composition continued; selected readings in easy prose and verse. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*4. Intermediate German. Selections from modern narrative and descriptive prose. Assigned outside readings and reports. Prerequisites: Courses 1, 2, and 3 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Downs.

25-26. Chemical German. Review of grammar. Reading of works on chemistry. Vocabulary exercises. Prerequisite: Course 24, 1, or one year of preparatory German.
Course 25—Twenty lessons (four credits). $13.50. Mr. Meessen.
Course 26—Twenty lessons (four credits). $13.50. Mr. Meessen.

30. Medical German I. This course is intended primarily for medical students. Articles on anatomy, biology, embryology, comparative anatomy, surgery, and other fields of medicine. Prerequisite: German 3, given in the College of Science, Literature, and the Arts.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

31. Medical German II. A continuation of Course 30.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

32. Medical German III. A continuation of Course 31.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

†50. Elementary Composition I. A thoro review of the fundamentals of German grammar with particular attention to, and practice in the use of, the idioms and characteristics of conversational and written German. Prerequisite: Course 4 or 40, or equivalent.
Eleven lessons (two credits). $7.00. Mr. Munro.

†51. Elementary Composition II. Translation and grammar review. Prerequisite: Course 50.
Eleven lessons (two credits). $7.00. Mr. Munro.

63. Drama I. Study of the present-day drama in Germany. Selected plays of Hebbel, Hauptmann, or Sudermann, with assigned readings and reports. Open to those who have completed Courses 1, 2, 3, and 4.
Twenty-four lessons (four and one-half credits). $15.00.
Mr. Downs.

* May be taken for one entrance unit.

† Both courses must be completed before credit is allowed for either.

64. Drama II. Study of the German drama of the eighteenth century and through the classic period. Selected plays of Lessing, Goethe, or Schiller, with assigned readings. Prerequisites as in Course 63.

Twenty-four lessons (four and one-half credits). $15.00.

Mr. Downs.

GREEK

(See Classics.)

HISTORY

PREPARATORY COURSES

1. American History. Similar to the third or fourth year of high school course. Part A—Social and economic life of the colonists, English colonial policy, the Revolution, the establishment of the new government, the West in national growth. Part B—Rise of sectional interests and the resultant conflict, economic development after the Civil War, and awakening interest in foreign affairs, American imperialistic adventures, the cause and results of the World War, the boom and depression years.

Part A, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

Part B, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

2. World History. Corresponds to the second or third year of high school course. Survey of the development of civilization from prehistoric man to the present. Part A through 1815, stresses oriental, Greek, Roman, and medieval civilizations, the Reformation, rise of national states, colonial rivalry, the French, the Revolution, Napoleon, and the Congress of Vienna. Part B stresses the Industrial Revolution, modern democracy in the various countries of Europe, imperialism, the World War, post-war problems and social, economic, and political conditions in the world today.

Part A, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

Part B, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

COLLEGE COURSES

1. European Civilization I (formerly called Modern World I). A survey of European civilization from the decline of Rome to the outbreak of the French Revolution. Emphasis is placed on the period since 1500.

Twenty-seven lessons (five credits). $17.00. Mrs. Mudgett.

2. European Civilization II (formerly called Modern World II). A survey of European civilization from 1789 to the present. Stress is laid on forces such as nationalism, liberalism, and imperialism which have helped in shaping present-day Europe.

Twenty-seven lessons (five credits). $17.00. Mrs. Mudgett.

†4. English History I—England in the Middle Ages. A survey of English history from the earliest times to 1485. Special attention is paid to the

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

growth of English nationalism and of such national institutions as the monarchy, the common law courts, and parliament.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†5. English History II—Expansion of England 1485-1748. The Reformation and the growth of the modern state; the constitutional struggle and the development of the overseas empire; the beginning of the wars with France.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†6. English History III—The Modern Empire and the Commonwealth of Nations. The Seven Years War and the dissolution of the First Empire; the Industrial Revolution; the struggle with Napoleon and the growth of the Second Empire; the development of democracy and of the Commonwealth of Nations.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†7. American History I (1763-1815). This course covers the period from 1763 to the close of the War of 1812, and includes the background of the Revolution, the War for Independence, and the formation of the national government, the growth of parties, and the conflicts over foreign policies, the development of democracy and of nationalism. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†8. American History II (1815-1865). A survey of the development of the United States from the close of the War of 1812 to the close of the Civil War. Special emphasis upon the westward movement, the new democracy, the tariff and public land questions, sectionalism and slavery conflicts, and the background of the Civil War. Careful study of the social and economic changes of the period. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†9. American History III (1865-1917). A survey of American history from the close of the Civil War to the entry of the United States into the World War. Special emphasis is laid on the economic changes of the period and their reaction upon politics. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

17. Europe in the Middle Ages (800-1500). A study of western European history from the fall of the Roman Empire to the rise of the modern states. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Twenty-seven lessons (five credits). $17.00. Mr. Kane.

†50. Ancient History I. The Ancient Near East. Survey of the stages of human existence in the prehistoric ages, the development of organized societies and great civilizations in Egypt and Mesopotamia, and formation of the great world empires of Assyria and Persia. Prerequisites: nine credits in history. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†51. Ancient History II. Greece. Prerequisite: History 50. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

†52. Ancient History III. Rome. Prerequisite: History 51. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†83. American Economic History I—Colonial Period. Two sets of influences meet to produce the early economic history of America; the first, what the colonist brought with him from Europe; the second, what he found here upon arrival. The origins and development of colonial economic life. Prerequisites: fifteen credits in history or ten credits in economics, political science, or sociology.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†84. American Economic History II—Early National Period. The struggle for political and economic independence, the protection of economic interests afforded by the new Constitution, the influence of the Supreme Court upon economic development, and the early westward movement. Prerequisite: History 83.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†85. American Economic History III—Later National Period. The economic history of the Civil War and the expansion of American business at home and abroad; the recent history of the Supreme Court. Prerequisite: History 84.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

92. History of Minnesota. The course covers Minnesota's history since the coming of the French, but with primary emphasis on the period following statehood. It surveys the development of the state's principal industries, the growth of its cities, its racial composition, and its changes in social and political attitudes. Access to Folwell's *History of Minnesota* and the magazine *Minnesota History* will be required for registration.

Sixteen lessons (three credits). $10.00. Miss Clapesattle.

HOME ECONOMICS

(For courses in Interior Decoration see Art Education.)

2. Introduction to Textiles. A course for store people and consumers. Study of materials in the store as used in garments and home furnishings. Rayon, wool, silk, cotton, and linen. Woven and knitted materials—processes of manufacture, features of construction and finish which affect the price, appearance, and serviceability of the fabric. Fiber identification. Trade terms used in newspaper and magazine advertising. Access to a compound microscope desirable but not imperative. A laboratory fee of $1.00 required, payable at time of registration.

Sixteen lessons (three credits). $10.00. Miss Caplin.

HOME LANDSCAPING AND GARDENING

163. Home Landscape Planning. A course for those who want to know how to plan the home grounds for greater use and enjoyment, with an introduction to the principles of landscape design, their use, and importance in the arrangement and decoration of the home grounds. This course will

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

be an artistic approach to the problems and prospects of home landscaping. It will also serve as a background for the pursuit of the popular hobby of gardening. There will be an independent student project of planning either a hypothetical home plot or the home place of the student. In this project the student will be guided by the instructor. The course will give the home owner and others interested in home landscaping a practical program of study.

Sixteen lessons (three credits). $10.00. Mr. Phillips.

HYGIENE

1c. Maternal and Child Hygiene. Prepared by the Division of Child Hygiene of the Minnesota Department of Health. The lessons take up personal hygiene and home hygiene with special emphasis on maternal and child welfare; diseases of infancy and childhood and care of sick in the home; prenatal hygiene, care of the mother, common complications and how to avoid them, preparation for confinement and after-care of the mother and child; infant care and feeding, weaning and later feeding, growth, development, and training. This course is given in co-operation with state agencies without charge. Offered to residents of Minnesota only.

Fifteen lessons (no credit). Free. Dr. Hartley.

INTERIOR DECORATION

(See Art Education.)

JOURNALISM

1c. Rural Community Reporting. Gathering and writing news of the rural neighborhood for the local community newspaper, sometimes called country correspondence; analysis of rural neighborhood groups and their news interests; study of the obligations of the rural reporter, to his neighborhood, and to his newspaper; practical exercises in the gathering and writing of rural news.

Sixteen lessons (three credits). $10.00. Mr. Barnhart.

†13. Newspaper Reporting I. Study of the newspaper audience; structure and writing of the news story; study of news values; exercises in journalistic style; analysis of newspapers; news gathering and reportorial methods. Numerous writing assignments.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

†14. Newspaper Reporting II. Continued study of the news gathering and of writing the "straight" news story; the human interest or feature story; analysis of newspapers; special types of reporting; "made" news and advanced interviewing. Numerous writing assignments. Prerequisite: Course 13.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

†15. Newspaper Reporting III. Study of newspaper law, including libel, rights of the press, study of "privilege," and so on; advanced reporting; the interpretative story; the series news story. Numerous writing assignments. Prerequisite: Course 14.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

† No credit will be given until Courses 13, 14, and 15 are completed.

68. Radio Writing. Study and practice in the several forms of radio writing, including news, advertising, and dramatic scripts. Radio analyses and surveys. Numerous writing assignments.
    Sixteen lessons (three credits). $10.00. Mr. Charnley.
    Registrations accepted after October 1, 1939.
73. Newspaper and Magazine Articles I. A study in the writing of facts and opinion articles, interviews and expository articles, both serious and feature, for newspapers and magazines. Main emphasis is laid on the journalistic type of article rather than the essay type.
    Sixteen lessons (three credits). $10.00. Mr. Steward.
74. Newspaper and Magazine Articles II. A continuation of Course I, including a study of typical first-class magazines and newspapers, both of specialized and general interest, including trade publications.
    Sixteen lessons (three credits). $10.00. Mr. Steward.
82. The Supervision of School Publications. A practical consideration of the problems of the high school teacher, especially of the teacher who is inadequately prepared for such work, who supervises the newspaper, or yearbook. Editorial content; staff organization; editing; headlines; typography; make-up; business management; costs; engraving; photography; and other subjects are considered.
    Sixteen lessons (three credits). $10.00. Mr. Kildow
104c. Editorial Writing I. Study of the style and structure of editorials; practice in writing various types of editorials. Prerequisite: English A-B-C, or Composition 4, 5, 6, or exemption from English requirement.
    Sixteen lessons (three credits). $10.00. Mr. Thackrey.
105c. Editorial Writing II. The writing of editorials is continued with the study of the editorial page, its functions and special problems. Prerequisite: Editorial Writing I.
    Sixteen lessons (three credits). $10.00. Mr. Thackrey.

LATIN

(See Classics.)

LETTERING

(See page 22.)

LIBRARY TRAINING

The courses in Library Training are not part of the curriculum of the Division of Library Instruction. Those students, therefore, who major in library training will not be allowed to apply credits earned in these subjects towards graduation. These courses may be taken as elective credits, and the credits earned in them will be accepted by the State Department of Education to apply toward a teacher-librarian certificate.

52. Elementary Cataloging. The forms and principles involved in making a dictionary card catalog. Based primarily upon the Cataloging Rules of the American Library Association, with reference to other codes. Directions for the use of the printed Library of Congress cards.
    Sixteen lessons (three credits). $10.00. Miss Ihm.

54. Elementary Classification. Based on the unabridged edition of the Dewey Decimal Classification. Aims to give an understanding of the standard classification scheme and its use in a library. Considerable attention is given to modifications and adaptations useful in various types of libraries. Includes Cutter-Sanborn author numbers, accession, and card shelf-list records.

Sixteen lessons (three credits). $10.00. Miss Ersted.

MATHEMATICS

PREPARATORY COURSES

1. Elementary Algebra A. A beginning course. Treats positive and negative numbers; addition, subtraction, multiplication, and division of monomials and polynomials; simple equations in one unknown quantity; elementary special products and factoring; highest common factor and lowest common multiple. Prerequisite: common school arithmetic.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

2. Elementary Algebra B. Treats addition, subtraction, multiplication, and division of fractions including complex fractions; equations in one unknown quantity which involve fractions; graphical representation; simultaneous equations of the first degree; square roots and quadratic surds; quadratic equations in one unknown quantity. Prerequisite: Course 1.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

3. Plane Geometry A. The work of this course is elementary geometry, Books I and II. Rectilinear figures and the circle, with the miscellaneous original exercises and some elementary construction problems. Prerequisites: Courses 1 and 2.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

4. Plane Geometry B. This course treats proportion, similar triangles, proportional properties of line segments, proportional properties of chords and secants, trigonometric ratios, areas of polygons, regular polygons and circles. Prerequisite: Course 3.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

5. Solid Geometry. Standard theorems and exercises. Practice in special proofs and original exercises to develop imagination and initiative. Prerequisites: Courses 3 and 4, or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

COLLEGE COURSES

*1. Higher Algebra. A review and a collegiate treatment of the topics of elementary algebra for those who have had one year of elementary algebra. Open for credit to any student offering less than one year of high school higher algebra for entrance.

Twenty-seven lessons (five credits). $17.00. Miss Carlson.

†6. Trigonometry. A beginning course of collegiate grade in plane trigonometry and logarithms. Solutions of triangles with applications to surveying and physics. Emphasis on properties of trigonometric functions,

* May be taken for one entrance unit.

† No student may receive credit for both Course 6 and Course 9c, or both Course 8 and Course 9c.

identities, and equations. Prerequisite: Mathematics 1, or high school higher algebra.§ Open for credit to students offering high school trigonometry for entrance.

Twenty-seven lessons (five credits). $17.00. Miss Thorp.

7. College Algebra. Quadratic equations, simultaneous quadratic equations, progressions, mathematical induction, the binomial theorem, permutations, combinations, probability, determinants, the theory of equations, infinite series, and partial fractions. Prerequisite: Mathematics 6.

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

†8. Commerce Algebra. Logarithms and selected topics in college algebra. A preparatory course for Mathematics 20. Prerequisite: Mathematics 1 or high school higher algebra.§

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

†9c. Logarithms. Definition and fundamental properties of logarithms. Use of logarithms in computing. Prerequisite: Mathematics 1 or high school higher algebra.

Six lessons (one credit). $5.00. Miss Gibbens.

20. Mathematics of Investment. The mathematical theory of simple interest, simple discount, compound interest and annuities certain. The applications deal with promissory notes, banking practice in the lending of money, the discharge of debts by periodic payments, depreciation funds, perpetuities, capitalization problems, and bonds. Prerequisites: Mathematics 6 and 7, or 7 and 9c, or 8.

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

30. Analytic Geometry. The elements of plane analytic geometry including the geometry of the conic sections, with a brief introduction to solid analytic geometry. Prerequisites: Courses 6 and 7.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

50. Calculus I. Differential Calculus. Limits, continuity, differentiation, maxima and minima, applications to geometry and physics, differentials, law of the mean, indeterminate forms, convergence of series, expansions and partial differentiation. Prerequisites: Mathematics 30.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

51. Calculus II. Integral Calculus. Indefinite integrals, definite integrals, convergence of improper integrals, the definite integral as the limit of a sum, multiple integrals and applications to geometry and mechanics. Prerequisite: Mathematics 50.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

62. Theory of Equations I. Complex numbers, the general solution of cubic and quadratic equations, numerical solution of equations, and relations between algebraic equations and geometric constructions by ruler and compasses. Prerequisite: Mathematics 50.

Sixteen lessons (three credits). $10.00. Miss Carlson.

106. Differential Equations. Prerequisites: Mathematics 51.

Sixteen lessons (three credits). $10.00. Mr. Underhill.

† No student may receive credit for both Course 6 and Course 9c, or both Course 8 and Course 9c.

§ A *substantial* high school course in advanced algebra for one semester is sufficient. However, some students with less than one year of advanced high school algebra may prefer to take Mathematics 1 before 6 or 8.

MUSIC

4. Harmony I. Sixteen lessons (three credits). $10.00. Miss Malcolm.
5. Harmony II. Sixteen lessons (three credits). $10.00. Miss Malcolm.
6. Harmony III. Sixteen lessons (three credits). $10.00. Miss Malcolm.

These courses are the equivalent of those given at the University of Minnesota for resident students in the Department of Music. Consist of the study of scales, intervals, chords, their structure and progression, harmonization of given basses, and melodies.

Registration accepted only upon approval of previous preparation in music, which must be fully stated in the application.

65. (Music Education). Instrumentation and Orchestration. A practical study of the standard instruments of band and orchestra; their compass, key, particular difficulties, characteristic passages, effective use in combinations, substitution for missing parts; reading and writing of scores and individual parts; all with reference particularly to the small orchestra and to school organizations. Prerequisites: Music 3, 4 (Harmony) or its equivalent.
    Sixteen lessons (three credits). $10.00. Mr. Pepinsky.
76. Form and Analysis. The analysis of well-known musical compositions with regard to their formal structure and content. Review of the literature of the preclassical period. Interpretation of musical ornaments. Decadence of polyphony and the development of the homophonic style and forms. Classic music. Influences on the Romantic movement. Tendencies in modern music. The meaning of music. Prerequisites: Courses 4 and 5, and General Psychology I and II.
    Sixteen lessons (three credits). $10.00. Mr. Pepinsky.

PHILOSOPHY

2. Logic. 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 is meant 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"? 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 prerequisites. (Credit not allowed pre-legal students.)
    Sixteen lessons (three credits). $10.00. Mr. Castell.

PHYSICAL EDUCATION

32. Introductory Principles of Physical Education. Principles and problems connected with the philosophy, organization, administration, program construction, and methods of teaching physical education.
    Sixteen lessons (three credits). $10.00. Mr. Bartelma.

56. Nature and Function of Play. A fundamental background course for either recreation or physical education. Proceeds from an understanding of the biological play drive, theories and philosophies of play, to the place of play in the modern world and its function in building an integrated personality.

Sixteen lessons (three credits). $10.00. Mr. Haislet.

63. Organization and Administration of Physical Education. Problems of organization, administration, and supervision. Arrangement of programs in physical education activities. Discussion of place of athletics in the program; schedule making; construction, equipment, and care of gymnasia and athletic fields.

Sixteen lessons (three credits). $10.00. Mr. Piper.

COURSES FOR WOMEN

52. Health and Safety Education. Study of principles, materials, methods and problems of health and safety education in preparation for teaching health.

Twelve lessons (two credits). $7.00. Miss Starr.
Registrations accepted after October 1, 1939.

53. Principles and Curriculum of Physical Education. In this course principles of philosophy, curriculum, method, and evaluation are studied in the light of their psychological, biological, and social significance.

Twelve lessons (two credits). $7.00. Miss Baker.
Registrations accepted after October 1, 1939.

54. Administration of Physical Education. Study of the care and use of facilities and equipment; organization of the physical education program from the standpoint of classification of the students, appraisal of activities, management of class with particular emphasis upo nthe program for girls and women. Relationship of the physical education program to the community.

Twelve lessons (two credits). $7.00. Miss Snell.
Registrations accepted after October 1, 1939.

PHYSICS

29. Introduction to Meteorology. Fundamental physical principles and first elements underlying meteorological study, weather map analysis and construction; also local meteorological observation. Prerequisite: permission of instructor. Available January 1, 1940.

Sixteen lessons (three credits). $10.00. Mr. Miller.

3. Elements of Mechanics. An elementary university course in the fundamental principles of mechanics. Theoretical course without laboratory work. Prerequisites: Trigonometry and one year of high school physics.

Sixteen lessons (three credits toward graduation in the College of Science, Literature, and the Arts). $10.00. Mr. Buchta.

NOTE.—Elements of Mechanics may be taken for credit toward a degree only when it is to be counted as purely elective. It is not accepted for credit in any professional course, nor in any course where physics is a required subject or is prerequisite to any other subject. All applications for physics are subject to approval by the Department of Physics.

POLISH

1c. Beginning Polish. An introductory course for students with no previous knowledge of Polish. Pronunciation, grammar, vocabulary drill, questionnaires, and easy conversation. No prerequisite.

Sixteen lessons (no credit). $10.00. Miss Krolowna.

2c. Advanced Polish. Intended for prospective teachers of Polish in secondary schools. Review of grammar, written composition, and book reports, suggestions on methods of teaching Polish. Prerequisites: two years of high school Polish or the equivalent, or 1c.

Sixteen lessons (no credit). $10.00. Miss Krolowna.

3c. History of Polish Literature. Survey of the literary movements and the most prominent authors through the eighteenth century. Written reports on the books read.

Sixteen lessons (no credit). $10.00. Miss Krolowna.

4c. Modern Polish Literature. The literary currents prevailing in Polish literature from 1863. Written reports on the books read.

Sixteen lessons (no credit). $10.00. Miss Krolowna.

POLITICAL SCIENCE

†1. American Government and Politics I. Introductory study of the American system of government—national, state, and local. Constitutional basis; forms of government and their historical development; participation in politics; parties and elections; legislatures and legislation.

Sixteen lessons (three credits). $10.00. Mr. Starr.

†2. American Government and Politics II. Units and areas of government and their interrelations; problems of administration; the civil service; expenditures and revenue; judicial organization and procedure; citizenship and private rights. Prerequisite for credit: Course 1.

Sixteen lessons (three credits). $10.00. Mr. Christensen.

3. American Government and Politics III. Law and law enforcement; government and business; social services and planning; national defense; American dependencies; foreign relations. Prerequisites for credit: Courses 1 and 2.

Sixteen lessons (three credits). $10.00. Mr. Christensen.

7. Comparative European Government. A descriptive and comparative study of the governments of the greater European powers: Great Britain, France, Italy, Germany, and Russia. Constitutions; electorates and elections, parliaments (structure and procedure); executives; civil services; political parties; courts; local government; economic constitutions. The emphasis is upon the present-day structure and functioning of the European governments, not their historical development. Prerequisite for credit: Course 1.

Twenty-seven lessons (five credits). $17.00. Mr. Starr.

15. Elements of Political Science. An analysis of the character and purpose of government, of the principles which underlie adequate political activity, and of the practices and organization which make for sound political conditions in the modern world. The course deals with both principles and practices, purposes and institutions. It endeavors to determine the

† Both parts must be completed before credit is allowed for either part.

place which the modern state should occupy in society and the means for the attainment of that position. Prerequisite for credit: Course 1.
Twenty-seven lessons (five credits). $17.00. Mr. Starr.

25. World Politics, 1878-1929. The foreign policy of the principal European powers since the Congress of Berlin. The pre-war and post-war periods are equally stressed, the continuity of development being emphasized, and each nation being studied separately. Prerequisite for credit: Course 1 or History 1-2.
Twenty-seven lessons (five credits). $17.00. Mr. Mills.

144. American Parties and Politics. The policies, composition, organization, activities, and functions of the political parties of today; suffrage, elections, and related subjects; evaluation of the party as a force in American government. Prerequisites for credit: Courses 1, 2, 3, or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Starr.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

50. Public and Personal Health. Causes of diseases and of physical defects; fundamental principles and working methods of health conservation and disease prevention. (Open to those who have not taken Course 3, 4, or Human Biology in the General College; no prerequisite.)
Sixteen lessons (three credits). $10.00. Dr. Hinckley.

52. Health Care of the Family. Factors affecting the health of the family as a unit; environmental factors, including elementary sanitation; prevention of accidents; communicable diseases, their transmission and prevention; prenatal and infant hygiene and care; principal problems in preschool and school hygiene; care of the sick room; observation and care of the patient; elementary symptomatology. (Not open to students who have taken Course 50 or 51.) Prerequisite: Bact. 41, Human Physiol. 4.
Sixteen lessons (three credits). $10.00. Dr. Lange.

PSYCHOLOGY

†1. General Psychology I. The purpose of this course is to acquaint the student with the general characteristics and laws of mental life and with the aims and methods of modern psychology.
Sixteen lessons (three credits). $10.00. Mr. White.

†2. General Psychology II. The study of mental development in its relation to heredity and training, with an investigation of the facts and theories of childhood and adolescence with special reference to their bearing on education. Prerequisite: Course 1.
Sixteen lessons (three credits). $10.00. Mr. White.

3. Psychology Applied to Daily Life. A course in the use of psychological methods in solving such problems as come up in the treatment of ill health, in the courtroom, in business offices and factories, in advertising, in education, in social and political life, in artistic creation and esthetic enjoyment. Prerequisites: General Psychology I and II.
Sixteen lessons (three credits). $10.00. Mr. White.

EDUCATIONAL PSYCHOLOGY

(See page 20.)

† Both courses must be completed before credit will be allowed for either.

ROMANCE LANGUAGES

FRENCH

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

*†1. Beginning French I. French grammar and reader; modern texts.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*†2. Beginning French II. A continuation of Course 1, which is prerequisite to it.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*3. Intermediate French I. Review of grammar; composition; reading of representative authors. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*4. Intermediate French II. A continuation of Course 3. Prerequisite: Course 3.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

53. Elementary French Composition. Translations of passages of connected prose dealing with everyday life in France. Prerequisites: Courses 3 and 4.
Sixteen lessons (three credits). $10.00. Mr. Clefton.

63. Advanced French Composition. A continuation of Course 53. It affords practical exercises in prose composition. Prerequisite: Course 53 or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Clefton.

ITALIAN

1. Beginning Italian I. Elements of pronunciation, grammar, and suitable readings. Emphasis upon accurate translation and composition.
Twenty-seven lessons (five credits). $17.00. Mr. Brackney.

2. Beginning Italian II. Completion of grammatical survey, and further readings. Prerequisite: Beginning Italian I.
Twenty-seven lessons (five credits). $17.00. Mr. Brackney.

SPANISH

*†1. Beginning Spanish I. Grammar and reading. In this course stress will be laid upon grammar, accurate translation, and composition.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*†2. Beginning Spanish II. Continuation of Course 1, which is prerequisite.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*3. Intermediate Spanish I. Review of grammar; composition, reading of modern Spanish texts. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*4. Intermediate Spanish II. A continuation of Course 3. Prerequisites: Courses 1, 2, and 3, or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

53. Elementary Spanish Composition. Connected prose composition dealing with everyday life in Spain. The aim is the ability to write Spanish. Prerequisites: Courses 1, 2, 3, and 4 or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Grismer.

* May be taken for one entrance unit.
† Both courses must be completed before credit will be allowed for either.

60. Advanced Spanish Composition. A continuation of Course 53, which is prerequisite.
Sixteen lessons (three credits). $10.00. Mr. Grismer.

SCANDINAVIAN

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

NORWEGIAN

*1. Beginning Norwegian I. Complete survey of Norwegian grammar. Composition. Reading of easy prose.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

*2. Beginning Norwegian II. Study of short stories and Björnson's *En Glad Gut*. Reading and composition. Prerequisite: Course 1 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

*3. Intermediate Norwegian. Continuation of Course 2. Based on Björnson's *Synnöve Solbakken*. Reading and composition. Prerequisite: Course 2.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

*4. Advanced Norwegian. Based on *Norge Gjennem Tiderne IV*. Reading of representative poetry and prose, literary and historical. Prerequisite: Course 3 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

25. Introduction to Norwegian Literature. Brief view of the entire field of Norwegian literature. Reading of four representative plays or books. Prerequisite: Course 3 or 4 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

51. Modern Norwegian Literature. History of Norwegian literature. A rapid survey of the earlier periods of Norwegian literature and the reading of representative works by later and modern authors, including Holberg, Asbjörnsen and Moe, Ibsen, Björnson, Lie, and Kielland. Prerequisite: Course 5 or reading knowledge of Norwegian.
Twenty-seven lessons (five credits). $17.00. Mr. Madsen.

62. Ibsen. This course is given entirely to the study of the life and works of Henrik Ibsen. Selected dramas read and interpreted. Emphasis on the chronological order and historical setting of his works. Prerequisite: Course 3 or 25 or reading knowledge of Norwegian-Danish.
Sixteen lessons (three credits). $10.00. Mr. Madsen.

63. Björnson. Study of the life and works of Björnstjerne Björnson. Reading of selected plays, novels, and poems. Prerequisite: Course 3 or 25 or reading knowledge of Norwegian-Danish.
Sixteen lessons (three credits). $10.00. Mr. Madsen.

SWEDISH

*7. Beginning Swedish I. Grammar and composition; select readings in easy prose and verse.
Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

* May be taken for one entrance unit.

*8. Beginning Swedish II. A continuation of Course 7, which is prerequisite.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

*9. Intermediate Swedish. Grammar; composition; easy reading. Prerequisites: Courses 7 and 8.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

10. Advanced Swedish I. The reading of selected authors in prose and poetry. Prerequisites: Courses 7, 8, and 9, or equivalent.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

11. Advanced Swedish II. A continuation of Course 10, which is prerequisite.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

107. Swedish Literature I. A history of Swedish literature from the seventeenth century to the present time. Selections from representative authors are studied. Prerequisites: Courses 7, 8, 9, 10, and 11 or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

108. Swedish Literature II. Continuation of Course 107, which is prerequisite.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

109. Swedish Literature III. Continuation of Course 108, which is prerequisite.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

SOCIAL SCIENCE

PREPARATORY COURSE

1. Social Science A. Aim is to give citizens an insight into the world in which they are living—an insight which will enable them to understand the economic, social, and political happenings of everyday existence and through their understanding to live more useful lives. Historical survey of man's progress up through the industrial revolution and present economic organization of society. Production, consumption, exchange, and transportation are taken up in turn. Much attention is given to certain fundamental principles which should underlie all business dealings.

Twenty lessons (one-half entrance unit). $12.50. Mr. Christianson.

2. Social Science B. Community Life and Civic Problems. Aims to give an insight into governmental activities as they affect the life of individuals in everyday contacts. Group life and community problems; brief survey of industrial society; exchange, transportation, labor, and capital; the machinery of government as a controlling factor in the township, village, municipality, county, state, and nation. In a good social organization the citizens are given a chance to express themselves when they do their civic duty to their respective communities. The activities emphasized in this course represent the main items in that duty.

Twenty lessons (one-half entrance unit). $12.50. Mr. Christianson.

SOCIOLOGY

1. Introduction to Sociology. An objective analysis of culture viewed as the product of group living. A survey of the fundamental parts of culture: culture traits, complexes, and patterns. Culture dynamics in terms

* May be taken for one entrance unit.

of the inventive process, diffusion, and problems attendant on culture change. The rôle of biological and geographical factors in social change; the relation between race and culture. The fundamental social institutions such as the family and the state; an attempt to indicate how they are affected by changes in the culture. This course is intended to introduce the student to the fundamental concepts of sociology and to give him a better understanding of the contemporary social order.

Twenty-seven lessons (five credits). $17.00. Mr. Monachesi.

6. Social Interaction. The influence of social interaction on the development of personality with special reference to the family and community. The rôle 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: Sociology 1.

Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

14. Rural Sociology. A study of rural society, dealing with the relationships of rural and urban individuals and groups. A presentation of such factual data as may be considered fundamental to the understanding of the problems of rural life. Prerequisite: Sociology 1 or special permission of instructor.

Sixteen lessons (three credits). $10.00. Mr. Forsyth.

49. Social Pathology. The scientific approach to the study of poverty, physical diseases and defectiveness, feeble-mindedness, insanity, vagrancy, etc. Prerequisites: ten credits in sociology or Sociology 1 and ten credits in social sciences or psychology.

Sixteen lessons (three credits). $10.00. Mr. Sletto.

60. Social Protection of the Child. Study of social obligations to the child, covering the period from prenatal development down through adolescence; development of the child-saving movement in the United States. Prerequisites: Sociology 1 and 49.

Sixteen lessons (three credits). $10.00. Mrs. Doyle.

90. The Field of Social Work. A study of the historical background and development of the major movements for social betterment. Attention will be focused on such aspects of professional social work as can be studied in local and nearby communities. Prerequisites: Sociology 1 and 49.

Sixteen lessons (three credits). $10.00. Mrs. Doyle.

101. Social Organization. Study of the organization and structure of social groups; development of social ideals and basic social processes of integration and disintegration of social institutions such as business units, church, family, local political institutions, school, and welfare institutions. Prerequisite: Course 1 or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Hoffman.

110. Rural Community Organization. This course is intended for those working in the rural community and small towns. It considers more technical problems than those discussed in the course in Rural Sociology. The subjects covered include co-operation, organization for health and sanitation, the social work of the church and schools, organized recreation clubs, social centers, the organization and co-operation of rural social agencies, small town and county organization, social surveys. Should

be preceded by Course 14 (Rural Sociology), but may be taken independently by those who have a special interest in the subject.

Sixteen lessons (three credits). $10.00. Mr. Forsyth.

119. The Family. Origin and forms of mating and family life; historical origins of the modern family; experiences and problems of the average person during his or her life cycle in the family situation; theories of family change. Prerequisite: Course 1 or its equivalent.

Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

120. Social Life and Cultural Change. A study of the conditions, causes, and criteria of social progress, with the probable limits thereto. Besides the lessons based on the assigned reading, the student will be expected to prepare a paper, either in fundamental criticism of some work on social progress, or in the nature of an original study based on the critical use of library materials. This course is open only to those who have taken Introduction to Sociology and Social Organization, either by correspondence study or in residence.

Sixteen lessons (three credits). $10.00. Mr. Schneider.

SPEECH

115. Playwriting. A detailed analysis of the structure of the play. A study of the fundamentals of character portrayal, dramatic crisis, dialog, and plot involvement. Functioning of the play as an organic unit. Assignments will be in the nature of writing of units that go to make up the fundamentals of playwriting technique. A study of modern play models and a classic survey of traditional techniques in drama. Prerequisite for credit: 9 credits in Elements of Dramatic Production, and permission of the instructor.

Sixteen lessons (three credits). $10.00. Mr. Lees.

INDEX

The Bulletin *of the* University *of* Minnesota

Institute of Technology

1939-1940

UNIVERSITY CALENDAR

1939-40

Fall Quarter

1939			
September	21	Thursday	Payment of fees closes, except for new students[1]
September	25	Monday	Entrance tests
September	25-26		Registration for Freshman Week for all new students entering the freshman class
September	25-29		Examinations for removal of conditions Physical examinations
September	27-30		Freshman Week
September	28-29		Registration period,[2] Institute of Technology
October	2	Monday	Fall quarter classes begin 8:30 a.m.[3]
October	19	Thursday	Senate meeting, 4:30 p.m.
October	21	Saturday	Homecoming Day
November	8	Wednesday	Mid-quarter grades due
November	11	Saturday	Armistice Day; a holiday
November	25	Saturday	Dad's Day
November	30	Thursday	Thanksgiving Day; a holiday
December	15-16 and 18-21		Final examination period
December	21	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends, 6:00 p.m.

Winter Quarter

December	28	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1940			
January	2	Tuesday	Entrance tests
January	2-3		Registration[2] for new students in all colleges
January	4	Thursday	Winter quarter classes begin 8:30 a.m.[3]
February	7	Wednesday	Mid-quarter grades due
February	12	Monday	Lincoln's Birthday; a holiday (except for extension)
February	15	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Thursday	Washington's Birthday; a holiday
March	15-16 and 18-21		Final examination period
March	21	Thursday	Commencement Convocation Payment of fees closes for all students[1] in residence winter quarter Winter quarter ends, 6:00 p.m.

See footnotes on page 3.

Spring Quarter

March	29	Friday	Entrance tests
March	29-30		Registration[2] for new students in all colleges
April	1	Monday	Spring quarter classes begin, 8:30 a.m.[3]
May	8	Wednesday	Mid-quarter grades due
May	11	Saturday	Mother's Day
May	16	Thursday	Cap and Gown Day Convocation
			Senate meeting, 4:30 p.m.
May	30	Thursday	Memorial Day; a holiday
June 7-8 and 10-14			Final examination period
June	9	Sunday	Baccalaureate service
June	14	Friday	Spring quarter ends, 6:00 p.m.
June	15	Saturday	Sixty-eighth annual commencement

Summer Session

June	17-18		Registration, first term
June	19	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Thursday	Independence Day; a holiday
July	25	Thursday	Commencement Convocation
July	26	Friday	First term closes
July	29	Monday	Registration and payment of fees for second term close
			Second term classes begin 8:00 a.m.
August	30	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 20.

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also late fees for late registration, page 22. 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.

[3] First hour classes begin at 8:15 a.m. at University Farm.

INSTITUTE OF TECHNOLOGY

Embracing the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy

FACULTY AND STAFF

ADMINISTRATION

Guy S. Ford, Ph.D., LL.D., Litt.D., L.H.D., President
Samuel C. Lind, Ph.D., D.Sc., Dean and Professor
Ora M. Leland, B.S., C.E., Dean of Administration
Charles A. Koepke, M.S.(M.E.), Administrative Assistant (Engineering and Architecture)
Lloyd H. Reyerson, Ph.D., Administrative Assistant (Chemistry)
Elting H. Comstock, M.S., Administrative Assistant and Chairman of Advanced Standing Committee (Mines and Metallurgy)
Howard D. Myers, B.S.(C.E.), Chairman of Advanced Standing Committee (Engineering and Architecture)
I. William Geiger, Ph.D., Chairman of Advanced Standing Committee (Chemistry)
Carl A. Herrick, M.E., Chairman of Registration, Schedule, and Admissions Committees
Lillian Cohen, Ph.D., Chairman of Registration and Schedule Committees (Chemistry)
Edwin M. Lambert, M.E., Chairman of Schedule Committee (Mines and Metallurgy)
Myron W. Griswold, E.M., Chairman of Registration Committee (Mines and Metallurgy)
M. Cannon Sneed, Ph.D., Chairman of Freshman Students' Work Committee
Robert W. French, B.S.(C.E.), Chairman of Students' Work Committee (Engineering and Architecture)
Norville C. Pervier, Ph.D., Chairman of Students' Work Committee (Chemistry)
Louis S. Heilig, E.M., Chairman of Students' Work Committee (Mines and Metallurgy)
Charles A. Koepke, M.S.(M.E.), Chairman of Students' Work Committee for five-year combined courses
George Filipetti, Ph.D., Secretary of Students' Work Committee for five-year combined courses
Hervey H. Barber, Ph.D., Superintendent of Supply and Equipment (Chemistry)

AERONAUTICAL ENGINEERING

John D. Akerman, B.S.(Aero.E.), Professor of Aeronautical Engineering and Head of the Department
Jean F. Piccard, D.Sc., Professor of Aeronautical Engineering (Stratosphere)
Burton J. Robertson, B.S., E.E., Associate Professor of Internal Combustion Engines
Joseph A. Wise, B.S.(C.E.), Associate Professor of Structural Engineering
Howard W. Barlow, B.S.(M.E.), M.S.(Aero.E.), Assistant Professor of Aeronautical Engineering
Charles Boehnlein, B.S., M.E., Assistant Professor of Aerodynamics

Edward E. Brush, B.S., Instructor in Aeronautical Engineering
Sidney M. Serebreny, B.S.Ae.Ed., Instructor in Airway Meteorology
Carl E. Swanson, M.S., E.E., Instructor in Aircraft Radio
Norbert F. Ruszaj, M.S.(Aero.E.), Teaching Assistant in Aeronautical Engineering

AGRICULTURAL ENGINEERING

Harry B. Roe, C.E., Professor of Drainage and Irrigation, Acting Chief of Division
William Boss, Professor Emeritus of Agricultural Engineering
Arthur J. Schwantes, M.S.(Ag.E.), Associate Professor of Farm Machinery and Land Clearing
Andrew Hustrulid, Ph.D., Assistant Professor of Farm Electric Power
Jesse H. Neal, Ag.E., Ph.D., Assistant Professor of Drainage and Irrigation
James B. Torrance, B.S.(Agr.), Assistant Professor of Farm Automotives
Arthur G. Tyler, B.S.(M.E.), Assistant Professor of Farm Sanitation and Water Supply
Hall B. White, M.S., Assistant Professor of Farm Structures
Clarence H. Christopherson, M.A., Instructor in Farm Structures
J. Grant Dent, Instructor in Mechanical Laboratory
Philip W. Manson, B.S.(C.E.), Instructor in Mechanical Laboratory and Surveying
Loren W. Neubauer, M.S.(C.E.), Instructor in Farm Structure Design
Joseph K. Park, B.S.(Ag.E.), Instructor in Surveying and Irrigation
John Strait, B.S.(M.E.), Instructor in Agricultural Automotives and Steam Power

ARCHITECTURE

Roy C. Jones, M.S.(Arch.), Professor of Architecture and Head of the School of Architecture
Frederick M. Mann, M.S.(Arch.), C.E., Professor of Architecture, Emeritus
Leon E. Arnal,* Architecte Diplomé par le Gouvernement Français, Professor of Architecture
S. Chatwood Burton, A.M., Professor of Fine Arts
Robert T. Jones, B.S.(Arch.), Professor of Architecture
David M. Robb, M.A., M.F.A., Associate Professor of Fine Arts (S.L.A.)
Rhodes Robertson, M.Arch., Associate Professor of Architecture
Robert G. Cerny, M.Arch., Assistant Professor of Architecture
Donald C. Heath, M.S.(Arch.), Assistant Professor of Architecture
Walter Huchthausen, M.A., Assistant Professor of Architecture
Elmer E. Young, Assistant Professor of Fine Arts
Winston C. Close, B.Arch., M.S., Lecturer in Architecture

CHEMISTRY

Inorganic Chemistry

M. Cannon Sneed, Ph.D., Professor of Inorganic Chemistry and Chief of the Division
Lloyd H. Reyerson, Ph.D., Professor of Inorganic Chemistry
Lillian Cohen, Ph.D., Associate Professor of Inorganic Chemistry
Hervey H. Barber, Ph.D., Assistant Professor of Inorganic Chemistry and Superintendent of Supply and Equipment
Gladstone B. Heisig, Ph.D., Assistant Professor of Inorganic Chemistry

* Absent on leave 1939-40.

Harold P. Klug, Ph.D., Assistant Professor of Inorganic Chemistry
J. Lewis Maynard, Ph.D., Assistant Professor of Inorganic Chemistry
Norville C. Pervier, Ph.D., Assistant Professor of Inorganic Chemistry
T. Ivan Taylor, Ph.D., Instructor in Inorganic Chemistry
Edward C. Ballard, B.S. in Chem., Teaching Assistant in Inorganic Chemistry
Roderick A. Barnes, B.S., Teaching Assistant in Inorganic Chemistry
Cyrus W. Bemmels, B.A. in Chem., Teaching Assistant in Inorganic Chemistry
Frederic G. Bordwell, B.A., Teaching Assistant in Inorganic Chemistry
Carl E. Bryan, B.A., Teaching Assistant in Inorganic Chemistry
Walter F. Edgell, B.S., Teaching Assistant in Inorganic Chemistry
Walter J. Gensler, B.Ch., Teaching Assistant in Inorganic Chemistry
Ronald Gledhill, B.A., Teaching Assistant in Inorganic Chemistry
Clarence W. Huffman, B.A., Teaching Assistant in Inorganic Chemistry
Clayton Huggett, B.S., Teaching Assistant in Inorganic Chemistry
Asa R. Larrick, Jr., B.S., Teaching Assistant in Inorganic Chemistry
Julian K. Lawson, B.S., Teaching Assistant in Inorganic Chemistry
Charles B. Mather, B.S. in Ch.E., Teaching Assistant in Inorganic Chemistry
William S. Reveal, B.S. in Ch.E., Teaching Assistant in Inorganic Chemistry
George F. Rouault, B.S. in Chem., Teaching Assistant in Inorganic Chemistry
Robert A. Scheiderbauer, B.A., Teaching Assistant in Inorganic Chemistry
George W. Sears, B.S., Teaching Assistant in Inorganic Chemistry
Grant O. Sedgwick, B.Ch.E., Teaching Assistant in Inorganic Chemistry
Roy W. Tess, B.S., Teaching Assistant in Inorganic Chemistry
————, Teaching Assistant in Inorganic Chemistry

Analytical Chemistry

Izaak M. Kolthoff, Ph.D., Professor of Analytical Chemistry and Chief of the Division
Charles F. Sidener, B.S., Professor of Analytical Chemistry, Emeritus
I. William Geiger, Ph.D., Associate Professor of Analytical Chemistry
Ernest B. Sandell, Ph.D., Assistant Professor of Analytical Chemistry
Edward J. Meehan, Ph.D., Instructor in Analytical Chemistry
Reuben B. Ellestad, Ph.D., Instructor in Rock Analysis (Geology)
Albert H. Bushey, B.A., Teaching Assistant in Analytical Chemistry
Carl S. Miller, M.S.(Chem.), Teaching Assistant in Analytical Chemistry
Isadore Shapiro, B.Ch.E., Teaching Assistant in Analytical Chemistry
James I. Watters, B.S., Teaching Assistant in Analytical Chemistry

Organic Chemistry

Lee I. Smith, Ph.D., Professor of Organic Chemistry and Chief of the Division
George B. Frankforter, Ph.D., Professor of Industrial Organic Chemistry, Emeritus
C. Frederick Koelsch, Ph.D., Associate Professor of Organic Chemistry
Walter M. Lauer, Ph.D., Associate Professor of Organic Chemistry
Richard T. Arnold, Ph.D., Instructor in Organic Chemistry
Franklin L. Austin, B.S. in Chem., Teaching Assistant in Organic Chemistry
Robert B. Carlin, B.Ch., Teaching Assistant in Organic Chemistry
Harvey H. Hoehn, B.Ed., Teaching Assistant in Organic Chemistry
James W. Horner, B.Ch.E., Teaching Assistant in Organic Chemistry
John A. King, B.A., Teaching Assistant in Organic Chemistry

Fred J. Lucht, B.S., Teaching Assistant in Organic Chemistry
Enos H. McMullen, B.A.(Chem.), Teaching Assistant in Organic Chemistry
Edgar Renfrew, B.S., Teaching Assistant in Organic Chemistry
Ambrose G. Whitney, B.S., Teaching Assistant in Organic Chemistry
Harold E. Zaugg, B.A., Teaching Assistant in Organic Chemistry
Donald J. Byers, B.S., du Pont Fellow
Willa B. Irwin, B.A., Hormel Fellow

Physical Chemistry

Frank H. MacDougall, Ph.D., Professor of Physical Chemistry and Chief of the Division
Herbert Freundlich, Ph.D., Professor of Colloid Chemistry
George Glockler, Ph.D., Professor of Physical Chemistry
Samuel C. Lind, Ph.D., D.Sc., Professor of Photo- and Radio-Chemistry
Robert S. Livingston, Ph.D., Associate Professor of Physical Chemistry
Donald E. Hull, Ph.D., Instructor in Physical Chemistry
Martin A. Cines, M.S., Teaching Assistant in Physical Chemistry
Lowell K. Coad, B.A., Teaching Assistant in Physical Chemistry
Gordon R. Leader, B.S.(Chem.), Teaching Assistant in Physical Chemistry
Edwin Orleman, B.S., Teaching Assistant in Physical Chemistry
Herman S. Seelig, B.S.(Ch.E.), Teaching Assistant in Physical Chemistry
Aldrich Syverson, B.Ch.E., Teaching Assistant in Physical Chemistry
Herbert A. Laitinen, B.Ch., Shevlin Fellow

Chemical Engineering

Charles A. Mann, Ph.D., Professor of Chemical Engineering and Chief of the Division
George H. Montillon, Ph.D., Professor of Chemical Engineering
Ralph E. Montonna, Ph.D., Professor of Chemical Engineering
Marvin C. Rogers, Ph.D., Assistant Professor of Chemical Engineering
Arthur E. Stoppel, Ch.E., Ph.D., Assistant Professor of Chemical Engineering
Cornelius S. Grove, Jr., M.S. in Ch.E., Instructor in Chemical Engineering
Edgar L. Piret, B.Ch.E., Docteur de l'Université de Lyon, Ph.D., Instructor in Chemical Engineering
Willard P. Armstrong, B.S. in Ch.E., Teaching Assistant in Inorganic Chemistry
Donald F. Chamberlain, B.Ch.E., Teaching Assistant in Chemical Engineering
John W. Clegg, B.S.(Ch.E.), Teaching Assistant in Chemical Engineering
George G. Eldredge, B.S., Teaching Assistant in Inorganic Chemistry
George Rieger III, B.Ch.E., Teaching Assistant in Chemical Engineering
Edward C. Ritchell, B.Ch.E., Teaching Assistant in Chemical Engineering
C. Dana Singer, B.Ch.E., Teaching Assistant in Chemical Engineering
Howard Turner, B.Ch.E., Teaching Assistant in Chemical Engineering
Clyde H. O. Berg, B.Ch.E., Hormel Fellow

CIVIL ENGINEERING

Frederic H. Bass, B.S., Professor of Municipal and Sanitary Engineering and Head of the Department
Alvin S. Cutler, C.E., Professor of Railway Engineering
Fred C. Lang, C.E., Professor of Highway Engineering
Chester A. Hughes, M.A.Sc., Associate Professor of Structural Engineering

Harold A. Whittaker, B.S., Associate Professor of Public Health
Joseph A. Wise, B.S.(C.E.), Associate Professor of Structural Engineering
Otto S. Zelner, B.S.(C.E.), Associate Professor of Surveying
Paul Andersen, Ph.D., Assistant Professor of Structural Engineering
Leonard F. Boon, C.E., Assistant Professor of Surveying
Miles S. Kersten, M.S.(C.E.), Instructor in Highway Engineering
George O. Pierce, B.S., Instructor in Public Health
———Teaching Assistant in Civil Engineering
———Teaching Assistant in Civil Engineering

DRAWING AND DESCRIPTIVE GEOMETRY

William H. Kirchner, B.S., Professor of Drawing and Descriptive Geometry, Emeritus
Robert W. French, B.S.(C.E.), Professor of Drawing and Descriptive Geometry
Henry C. T. Eggers, E.E., Ph.D., Associate Professor of Drawing and Descriptive Geometry
Howard D. Myers, B.S.(C.E.), Associate Professor of Drawing and Descriptive Geometry
Ivan Doseff, B.S., Assistant Professor of Drawing and Fine Arts
Alex S. Levens, C.E., Assistant Professor of Drawing and Descriptive Geometry
Orrin W. Potter, E.M., M.S., Assistant Professor of Drawing and Descriptive Geometry
Robert F. Schuck, B.S.(E.E.), Assistant Professor of Drawing and Descriptive Geometry
William S. Williams, B.S.(E.E.), Assistant Professor of Drawing and Descriptive Geometry
Fred T. Cruzen, B.S.(E.E.), Instructor in Drawing and Descriptive Geometry
Lloyd J. Quaid, B.S.(E.E.), Instructor in Drawing and Descriptive Geometry
Emmett O. Shultz, B.S.(M.E.), Instructor in Drawing and Descriptive Geometry
Garvin L. von Eschen, B.Aero.E., M.S., Instructor in Drawing and Descriptive Geometry

ELECTRICAL ENGINEERING

John M. Bryant, M.S., E.E., Professor of Electrical Engineering and Head of the Department
Henry E. Hartig,* B.S.(E.E.), Ph.D., Associate Professor of Communication Engineering
Elmer W. Johnson, B.S., M.E., E.E., Associate Professor of Electric Power Engineering
John H. Kuhlmann, B.A., B.E., E.E., Associate Professor of Electrical Design
James S. Webb, Ph.D., Associate Professor of Radio Engineering
Loyst C. Caverley, M.S.(E.E.), Assistant Professor of Electric Power Engineering
Milo E. Todd, B.A., E.E., Assistant Professor of Electric Power Engineering
———, Instructor in Electrical Engineering
Arthur W. Melloh, M.S.(E.E.), Instructor in Electrical Engineering
O. William Muckenhirn, M.S., Instructor in Electrical Engineering
Davis Bartholomew, B.E.E., Teaching Assistant in Electrical Engineering
Myron W. Leslie, B.E.E., Teaching Assistant in Electrical Engineering
Morris Newmann, M.S.(E.E.), Teaching Assistant in Electrical Engineering

* Absent on leave 1939-40.

ENGINEERING ENGLISH

Harlow C. Richardson, B.A., Assistant Professor of English, in charge of Engineering English
Luther N. Becklund, B.A., Instructor in English
John S. Fitch, M.A., Instructor in English
Ledru O. Guthrie, M.A., Instructor in English
Clifford I. Haga, B.A., Instructor in English
Hans F. Hansen, M.A., Instructor in English
Carl A. Lefevre, M.A., Instructor in English

ENGINEERING EXPERIMENT STATION

Frank B. Rowley, B.S., M.E., Director Engineering Experiment Station
Axel B. Algren, M.S.(M.E.), Assistant Director Engineering Experiment Station
Richard C. Jordan, M.S.(M.E.), Instructor in Heating and Ventilation
Clarence E. Lund, M.S.(M.E.), Mechanical Engineer
Thomas Klingel, B.(C.E.), Research Assistant
Harold E. Ostdahl, B.(M.E.), Research Assistant
Carl W. Stuart, B.(M.E.), Research Assistant
———, Research Assistant
———, Research Assistant
———, Research Assistant
———, Research Assistant
———, Research Assistant

GENERAL ENGINEERING

Victor L. Fixen, E.M., LL.B., Lecturer in Engineering Contracts and Specifications

MATHEMATICS AND MECHANICS

Hans H. Dalaker, Ph.D., Professor of Mathematics and Acting Head of the Department
William E. Brooke, B.C.E., M.A., Professor of Mathematics and Mechanics, Emeritus
George C. Priester, Ph.D., Professor of Materials of Engineering
Lorenz G. Straub, Ph.D., C.E., Professor of Hydraulics
Hugh B. Wilcox, B.S.(E.E.), M.S., Professor of Mechanics
Carl A. Herrick, M.E., Associate Professor of Mathematics and Mechanics
Charles Boehnlein, B.S., M.E., Assistant Professor of Aerodynamics
Harry A. Doeringsfeld, C.E., Assistant Professor of Mathematics and Mechanics
William M. McClintock, M.A., Assistant Professor of Mathematics and Mechanics, Emeritus
Forrest E. Miller, M.S., Assistant Professor of Materials of Engineering
Glenn H. Peebles, M.S., Assistant Professor of Mathematics and Mechanics
James C. Sanderson, Ph.D., Assistant Professor of Mathematics and Mechanics
Roderick W. Siler, B.S., Assistant Professor of Mathematics and Mechanics
John A. Henry, B.S.(C.E.), Instructor in Mathematics and Mechanics
Edward S. Loye, M.S., Instructor in Mathematics and Mechanics
John S. McNown, M.S.(Hyd.Eng.), Instructor in Mathematics and Mechanics
F. G. Eric Peterson, M.S., Instructor in Mathematics and Mechanics
Albert R. Poole, Ph.D., Instructor in Mathematics and Mechanics
John F. Ripkin, B.S.(C.E.), Instructor in Mathematics and Mechanics
Max G. Scherberg, Ph.D., Instructor in Mathematics and Mechanics

E. Neil Shawhan, Ph.D., Instructor in Mathematics and Mechanics
Carl E. Swanson, M.S., E.E., Instructor in Mathematics and Mechanics
William A. Brastad, M.S., Assistant in Mathematics and Mechanics
Howard L. Daniels, B.S.(E.E.), Assistant in Mathematics and Mechanics
William H. Mather, B.S.(Met.), Assistant in Mathematics and Mechanics
Omar L. Patterson, B.S.(E.E.), Assistant in Mathematics and Mechanics
Odgen L. Prestholdt, B.S.(E.E.), Assistant in Mathematics and Mechanics
Laurence Wilcox, B.S.(E.E.), Assistant in Mathematics and Mechanics

MECHANICAL ENGINEERING

John R. DuPriest, B.S.(E.E.), M.E., M.M.E., Professor of Mechanical Engineering and Head of the Department
Charles A. Koepke, M.S.(M.E.), Professor of Industrial Engineering and Superintendent of Shops
Frank B. Rowley, B.S., M.E., Professor of Mechanical Engineering and Director of the Engineering Experiment Station
Charles F. Shoop, B.S., B.S.(M.E.), Professor of Steam Engineering
John V. Martenis, M.E., Associate Professor of Machine Design
Burton J. Robertson, B.S., E.E., Associate Professor of Internal Combustion Engines
Robert E. Summers, B.S.(M.E.), M.S.(Chem.E.), Associate Professor of Mechanical Engineering
Axel B. Algren, M.S.(M.E.), Assistant Professor of Mechanical Engineering
Arthur R. Ford, M.S.(M.E.), Assistant Professor of Internal Combustion Engines
Thomas P. Hughes, M.S.(Met.), Assistant Professor of Mechanical Engineering
William H. Richards, Assistant Professor of Woodworking
James J. Ryan, M.E., Assistant Professor of Machine Design
Arnold C. Cobb, M.S.(M.E.), Instructor in Mechanical Engineering
Bert A. Crowder, B.S.(M.E.), Instructor in Machine Shop
William H. Easton, B.S.(M.E.), M.S., Instructor in Mechanical Engineering
Fulton Holtby, M.E., M.S., Instructor in Foundry Practice
Otis M. Larsen, M.S.(M.E.), Instructor in Mechanical Engineering
Herald K. Palmer, B.S., B.S.(E.E.), M.S.(M.E.), Instructor in Mechanical Engineering
Carmine Sacco, B.S.(M.E.), Instructor in Forging and Welding
Herbert F. Scobie, B.Ch., Instructor in Foundry
Lee S. Whitson, M.S.(M.E.), Instructor in Mechanical Engineering
———, Instructor in Mechanical Engineering

METALLURGY

Thomas L. Joseph, M.A., Professor of Ferrous Metallurgy and Head of the Department
William R. Appleby, M.A., Professor of Metallurgy, Emeritus
Peter Christianson, B.S., E.M., Professor of Ferrous Metallurgy, Emeritus
Ralph L. Dowdell, Met.E., Ph.D., Professor of Metallography
Levi B. Pease, M.S., Professor of Nonferrous Metallurgy
Henry S. Jerabek, Ph.D., Assistant Professor of Metallography
John N. Searles, E.M., M.S., Assistant Professor of Ore Dressing
Arthur C. Forsyth, Met.E., Ph.D., Instructor in Metallography
Myron W. Griswold, E.M., Instructor in Nonferrous Metallurgy
Frank W. Scott, M.S., Instructor in Ferrous Metallurgy

Carrie H. Green, Teaching Assistant in Metallography
Martin H. Kalina, M.S., Teaching Assistant in Metallurgy
Charles F. Quest, B.Ch.E., Teaching Assistant in Metallurgy

MINES EXPERIMENT STATION

Edward W. Davis, B.S., E.E., Professor and Superintendent of Mines Experiment Station
Henry H. Wade, E.M., Metallurgist
John C. Durfee, Met.E., Junior Metallurgist Engineer

MINING AND PETROLEUM ENGINEERING

Elting H. Comstock, M.S., Professor of Mine Plant and Mining and Head of the Department
Edwin M. Lambert, M.E., Professor of Mining Engineering
Walter H. Parker, E.M., Professor of Mining and Petroleum Engineering
Louis S. Heilig, E.M., Associate Professor of Mine Plant and Mining
Washington D. Lacabanne, M.S., Instructor in Petroleum Engineering

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

ASTRONOMY

Willem J. Luyten, Ph.D., Professor of Astronomy

BOTANY

C. Otto Rosendahl, Ph.D., Professor of Botany and Chairman of the Department
Ned L. Huff, M.A., Assistant Professor of Botany

GEOLOGY AND MINERALOGY

William H. Emmons, Ph.D., Professor of Geology and Mineralogy and Head of the Department
Frank F. Grout, Ph.D., Professor of Geology and Mineralogy
Clinton R. Stauffer, Ph.D., Professor of Geology and Mineralogy
John W. Gruner, Ph.D., Associate Professor of Geology and Mineralogy
George M. Schwartz, Ph.D., Associate Professor of Geology and Mineralogy
George A. Thiel, Ph.D., Associate Professor of Geology and Mineralogy
Reuben B. Ellestad, Ph.D., Instructor in Rock Analysis
Franklin B. Hanley, B.A., Instructor in Geology and Mineralogy

GERMAN

Oscar C. Burkhard, Ph.D., Professor of German and Chairman of the Department
Carl P. Klitzke, Ph.D., Instructor in German
Donald F. Munro, Ph.D., Instructor in German
Alvin E. Prottengeier, M.A., Instructor in German
Frederick Wagman, M.A., Instructor in German

JOURNALISM

Thomas F. Barnhart, M.A., Professor of Journalism

PHYSICS

J. William Buchta, Ph.D., Professor of Physics and Chairman of the Department
Henry A. Erikson, Ph.D., Professor of Physics, Emeritus
Louallen F. Miller, Ph.D., Professor of Physics

John T. Tate, Ph.D., Dean of the College of Science, Literature, and the Arts, and Professor of Physics
Anthony Zeleny, Ph.D., Professor of Physics, Emeritus
Edward L. Hill, 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
Alfred O. C. Nier, Ph.D., Assistant Professor of Physics
Lynn H. Rumbaugh, Ph.D., Assistant Professor of Physics
Wilfred W. Wetzel, Ph.D., Assistant Professor of Physics
William B. Haliday, B.A., Junior Physicist

POLITICAL SCIENCE

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

ZOOLOGY

Dwight E. Minnich, Ph.D., Professor of Zoology and Chairman of the Department
Jerry E. Wodsedalek, 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
Leroy S. Palmer, Ph.D., Professor of Agricultural Biochemistry
David R. Briggs, Ph.D., Associate Professor of Agricultural Biochemistry
William M. 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., Associate Professor of Agricultural Economics

AGRONOMY AND PLANT GENETICS

Herbert K. Hayes, D.Sc., Professor of Agronomy and Plant Genetics and Chief of the Division
Iver J. Johnson, Ph.D., Associate Professor of Agronomy and Plant Genetics

ANIMAL AND POULTRY HUSBANDRY

Walter H. Peters, M.Agr., Professor of Animal Husbandry and Chief of the Division

DAIRY HUSBANDRY

James B. Fitch, M.S., Professor of Dairy Husbandry and Chief of the Division
Willes B. Combs, M.A., Professor of Dairy Husbandry
Harold Macy, Ph.D., Professor of Dairy Bacteriology

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., Assistant Professor of Rhetoric
William J. Routledge, B.A., Assistant Professor of 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
Arthur T. Henrici, M.D., Professor of Bacteriology and Immunology
H. Orin Halvorson, Ch.E., Ph.D., Associate Professor of Bacteriology and Immunology
Charles E. Skinner, Ph.D., Assistant Professor of Bacteriology and Immunology

PHYSIOLOGICAL CHEMISTRY

Jesse F. McClendon, Ph.D., Professor of Physiological Chemistry
Wallace D. Armstrong, M.D., Ph.D., Assistant Professor of Physiological Chemistry
Allan Hemingway, Ph.D., Assistant Professor of Physiological Chemistry
Leo T. Samuels, Ph.D., Assistant Professor of Physiological Chemistry
L. Earle Arnow, 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 Administration
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 Finance
Roland S. Vaile, M.A., Professor of Economics and Marketing

Dale Yoder, Ph.D., Professor of Economics and Personnel Administration
Arthur M. Borak, Ph.D., Associate Professor of Economics
Richard L. Kozelka, Ph.D., Associate Professor of Economics and Statistics
Emerson P. Schmidt, Ph.D., Associate Professor of Economics
Arthur R. Upgren, B.A., Associate Professor of Economics and Finance
A. Hamilton Chute, Ph.D., Assistant Professor of Marketing
Alfred B. Cummins, J.D., M.S. in M.E., Assistant Professor of Business Administration
Walter R. Myers, Ph.D., Assistant Professor of Economics and Finance
Harry J. Ostlund, B.A., Assistant Professor of Accounting
George J. Stigler, Ph.D., Assistant Professor of Economics
Francis M. Boddy, M.A., Lecturer in Economics
Franklin D. Gray, B.A., B.C.L., (Oxon.), Lecturer in Business Law
Ben W. Palmer, M.A., LL.B., Lecturer in Business Law
Marshman Wattson, B.A., LL.B., Lecturer in Business Law
Helen G. Canoyer, M.A., Instructor in Economics and Marketing
Richard A. Graves, M.A., Instructor in Economics and Insurance
Reuel I. Lund, M.A., C.P.A., Instructor in Economics and Accounting
Clarence A. Nelson, B.B.A., Instructor in Accounting
Edmund A. Nightingale, M.A., Instructor in Economics and Transportation
Richard K. Gaumnitz, M.A., Teaching Assistant in Statistics

MILITARY SCIENCE AND TACTICS

Charles A. French, Lieutenant Colonel, Coast Artillery Corps, B.S., Professor of Military Science and Tactics
Edwin L. Brackney, Lieutenant Colonel Medical Corps, M.D., Assistant Professor of Military Science and Tactics
Coburn L. Berry, Major, Coast Artillery Corps, B.S., Assistant Professor of Military Science and Tactics
Thomas H. Maddocks, Captain, Signal Corps, M.S., Assistant Professor of Military Science and Tactics
Layton A. Zimmer, Captain, Coast Artillery Corps, B.S., Assistant Professor of Military Science and Tactics
Leslie V. Closson, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics
Kenneth Cruse, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics
William E. Bowen, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

NAVAL SCIENCE AND TACTICS

Frank H. Kelly, Jr., Captain, United States Navy, Professor of Naval Science and Tactics
Harold F. Pullen, Lieutenant Commander, United States Navy, Associate Professor of Naval Science and Tactics
Calvin A. Walker, Jr., Lieutenant, United States Navy, 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 the 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 and Architectural Engineering were announced in 1912. In 1925, the name of the Department of Architecture was changed to the School of Architecture. The course in Interior Architecture was established in 1923 being called Interior Decoration until 1929. 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 and the Armory are also utilized. The new 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 industral 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 Saint Anthony Falls Hydraulic Laboratory located on Hennepin Island, and the Oak Street Laboratories on University Avenue, both of which have been recently completed, 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.

A four-year course in Interior Architecture is provided, of which the first two years are taken in the College of Science, Literature, and the Arts and the last two years in the Institute of Technology, leading to the degree of bachelor of interior architecture.

The Engineering Pre-business 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 con-

ferred 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 from the four-year course, thus making a five-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 of 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, ½ to 2 units; English and American history, ½ or 1 unit each; economics and sociology, ½ unit each; American government, commercial geography, and history of commerce, ½ or 1 unit each.

Group D Mathematics: elementary algebra and plane geometry, 1 unit each; unified mathematics, 2 units; higher algebra, ½ or 1 unit; solid geometry and trigonometry, ½ unit each.

Group E Natural sciences: biology, physics, and chemistry, 1 unit each; botany and zoology, ½ or 1 unit each; physiology, astronomy, and geology, ½ 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 who have taken college algebra or trigonometry in high school with satisfactory records may be permitted to take comprehensive examinations for credit in these subjects, if they apply before registration day at the office of the Department of Mathematics and Mechanics.

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 or Interior 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, he 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.

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.

FEES AND EXPENSES

The annual fee for students in this college is $90 for residents and $135 for nonresidents, one third of which 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):	
Residents of Minnesota	$30.00
Nonresidents	45.00
Matriculation deposit‡ (first quarter only)	
Men	15.00
Women	5.00
Incidental fee, per quarter	8.40
Special fees:	
Examination for removal of condition	1.00
Examination for credit (after the first six weeks in residence)	5.00
Special examination	5.00
Chemistry deposits, including laboratory fee of $2.00 per quarter	10.00
Graduation fee	7.50

Late fees.—The fee for the privilege of late registration or late payment of fees shall be $2 prior to the day classes begin, on and after which the fee increases at the rate of $1 per day, provided no student shall pay more than $10 in fees for late privileges in any given quarter The fee for late change of registration is $2.

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
Total	$800.00

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.

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. Correspondence study courses in academic subjects will be accepted, but not in excess of 9 credits.

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. 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 upon 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 in the spring quarter 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 chemical 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.

In cases of continued low scholarship, even tho all the courses of the curriculum have been passed, the faculty reserves the right to require additional work to be completed, over and above the regular curriculum, and with a specified grade, before the degree will be recommended.

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.

Requirements for Graduation in the School of Chemistry

1. Students registered in the School of Chemistry shall be assigned honor points on the completion of any course in accordance with the following scheme: grade A, 3 honor points per credit; grade B, 2 honor points per credit; grade C, 1 honor point per credit; grade D or lower, no honor points per credit.

2. As a requirement for graduation, a student must obtain at least 1 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 1 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 *waive 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.

Students Entering with Advanced Standing

10. The above regulations shall apply to students entering with advanced standing as far as the work taken by them after entering the school is concerned.

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. J. 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.

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 prepara-

tion 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 the Phi Lambda Upsilon honorary chemical fraternity and the Twin City Alumni Association of the 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

This department is a unit of the Naval Reserve Officers' Training Corps and is administered by commissioned officers of the regular Navy, all of whom are graduates of the United States Naval Academy, with considerable experience at sea. This department offer undergraduate four-year courses which may be counted toward a degree. Satisfactory completion of the four-year course and one cruise of about three weeks' duration on a naval vessel at the end of the junior year will qualify the student 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 a prescribed physical examination. If commissioned as a reserve officer, he may be detailed for active duty only upon his own request, except in case of national emergency.

Students must be citizens of the United States, regularly enrolled in the University as candidates for a degree and will not be permitted to register for the courses in Naval Science until they have been accepted by the officer in charge of the Minnesota Naval Unit.

Uniforms and equipment are furnished by the Government without charge. Upon satisfactory completion of the course the uniform becomes the property of the student. Monthly commutation of subsistence together with transportation and cruise pay are paid by the Navy Department to juniors and seniors who maintain a satisfactory standing and attendance.

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 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
Agricultural Engineering
Architecture
Interior Architecture
Civil Engineering
Electrical Engineering
Engineering and Business Administration
Engineering Pre-Business
Mechanical Engineering

SCHOOL OF CHEMISTRY

Chemistry
Chemical Engineering
Physics

SCHOOL OF MINES AND METALLURGY

Mining Engineering
Metallurgical Engineering
Geological 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 subfreshman English composition 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 who have not had high school chemistry and all students entering the School of Mines and Metallurgy 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-8s, 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 those who have had higher algebra will register for Course 11 (College Algebra). Course 9 will be followed by Courses 11, 12, and 13 during the winter and spring quarters and the following Summer Session, respectively.

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 subfreshman English Composition 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 subfreshman English Composition in the Extension Division. Fee $7.50.

AERONAUTICAL, AGRICULTURAL, CIVIL, ELECTRICAL, AND MECHANICAL ENGINEERING, AND PRE-BUSINESS

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.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Inorg. Chem. 4	General Inorganic Chemistry	4	1	3	3
Engl. 4	Composition	3	3	.....	.....
Draw. 1	Engineering Drawing	3	.....	.....	8
M.E. 5, 8, or 11*	Shop Practice (for Pre-bus.)	2	.....	1	4
G.E. 11	Orientation	0	.....	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. 2	Engineering Drawing	3	.....	.....	8
M.E. 5, 8, or 11*	Shop Practice (for Pre-bus.)	2	.....	1	4
G.E. 12	Orientation	0	.....	1	.....
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg. Chem. 16	Qualitative Chemical Analysis	5	.....	3	6
Engl. 6	Composition	3	3	.....	.....
Draw. 3	Descriptive Geometry	3	.....	.....	8
M.E. 5, 8, or 11*	Shop Practice (for Pre-bus.)	2	.....	1	4
G.E. 13†	Orientation	0	.....	1	.....

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.

* Freshmen in Engineering Pre-Business are required to take Shop Practice, M.E. 5, 8, 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 30.

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 is assuming 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 being given to lighter-than-air craft as well. 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, or private organizations.

Students taking the five-year combined course in aeronautical engineering and business administration may substitute business courses for C.E. 17, Met. 152, and six credits of the optional courses listed in the footnote on page 33.

For fresman year, see page 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
Draw. 28†	Drafting	2	.....	.....	6
Aero.E. 1	Aeronautics	3	3	.....	.....
M.E. 6	Pattern Practice	2	.....	1	4
M.E. 70	Mechanical Technology	1	.....	2	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Aero.E. 2	Aircraft and Auto Engines	3	2	.....	2
M.E. 12	Forging, Heat Treating, and Welding	2	.....	1	4
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
Aero.E. 3	Aeronautics	3	3	.....	.....
C.E. 17	Surveying	3	.....	1	7
Draw. 29	Drafting	2	.....	.....	6

† For permissible substitute, see page 74.

JUNIOR YEAR§

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
Aero.E. 100	Aerodynamics	3	3	.....	.....
M.E. 30	Steam Engineering	3	3	.....	.....
M.E. 32	Elementary Mechanical Laboratory	2	.....	.....	4
M.E. 17	Machine Shop Practice	3	.....	1	7
	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. 31	Thermodynamics	3	2	1	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	.....	1	6
	Electives*				

SENIOR YEAR§

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

* For list of elective courses in other colleges, see page 73.

† Any one or two of the following courses: Aero.E. 122, Airplane Design, 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.

§ 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.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
E.E. 48	Electric Power	3	2	.....	2
M.E. 158	Aero Engine Testing	2	.....	.....	6
Aero.E. 122†	Airplane Design	3	1	.....	6
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 17¼ 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 governments, and with development companies; as agricultural advisers with power companies in development of rural service; as agricultural engineering 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

* For list of elective courses in other colleges, see page 73.

† Any one or two of the following courses: Aero.E. 122, Airplane Design, 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.

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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
Ag.E. 43	Mechanical Laboratory	3	.....	1	5
Agron. 1	General Farm Crops	3	3	.....	.....
Econ. 8	General Economics	3	3	.....	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Soils 6	Soils	5	5	.....	.....
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. 5	Farm Structures Laboratory	3	.....	1	4
Geol. 5	Engineering Geology	3	.....	3	.....
Ag.E. 52	Elements of Farm Machinery	3	1	1	3
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
Ag.Econ. 102	Farm Management: Organization	3	.....	3	.....
Ag.E. 51†	Land Reclamation	5	1	4	.....
or					
Soils 108	Physical Properties of Soils	3	.....	1	6
M.E. 26	Mechanism and Kinematics	3	3	.....	.....
M.E. 31	Thermodynamics	3	2	1	2
	Spring Quarter				
A.H. 50*	Fundamentals of Livestock Production	3	.....	3	.....
or					
D.H. 52†	The Dairy Industry	3	.....	3	.....
M.E. 27	Machine Design	3	.....	2	3
Ag.E. 53	Farm Structures	3	1	1	3
Ag.E. 72†	Applied Electricity	3	.....	1	6
or					
Ag.E. 73*	Steam Boilers and Heat Engines	3	1	1	3
C.E. 37	Structural Engineering	3	.....	1	7
Ag.E. 37	Rural Sanitation	3	.....	3	.....

* Given only in alternate years, 1939, 1941, etc.
† Given only in alternate years, 1940, 1942, etc.

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	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
C.E. 146	Plain Concrete	3	.....	2	4
	Electives to complete program.				
	Winter Quarter				
Ag.E. 51†	Land Reclamation	5	1	4	.....
or					
Soils 108	Physical Properties of Soils	3	.....	1	6
G.E. 101	Contracts and Specifications	3	.....	3	.....
Rhet. 22	Public Speaking	3	3	.....	.....
	Electives to complete program.				
	Spring Quarter				
D.H. 52†	The Dairy Industry	3	.....	3	.....
or					
A.H. 50*	Fundamentals of Livestock Production	3	3	.....	.....
Ag.E. 72†	Applied Electricity	3	.....	1	6
or					
Ag.E. 73*	Steam Boilers and Heat Engines	3	1	1	2
	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.

Course No.	Title	Credits
	Farm Structures	
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
G.E. 81s	Estimating	3
Hort. 74w	Principles of Landscape Design	3
	Farm Power and Machinery	
M.E. 18w,s	Advanced Machine Shop Practice	3
M.E. 121f	Machine Design	2
M.E. 131w,132s	Thermodynamics, per quarter	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. 193w	Hydraulic Measurements	3

* Given only in alternate years, 1939, 1941, etc.

† Given only in alternate years, 1940, 1942, etc.

§ Students taking the combined five-year course in agricultural engineering and business administration see statement on page 34.

General

Course No.	Title	Credits
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 five 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 and industrial design. For further information see the Bulletin of the College of Science, Literature, and the Arts and the Combined Class Schedule.

3. Four-year course leading to the degree of bachelor of interior architecture (B.Int.Arch.) in the Institute of Technology the first two years of which are spent in the College of Science, Literature, and the Arts and the last two in the Institute of Technology.

Plan 3 is intended for students who wish to specialize in the design and decoration of interiors. For further information see page 41.

4. Five-year course leading to the degree of bachelor of architecture (B.Arch.) in the Institute of Technology.
5. 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 4 and 5 are intended primarily for students who expect to enter the professional practice of architecture in any of its recognized phases. 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. Secondarily, they serve as advantageous approaches to various fields allied to architecture. For further information see page 38 for the five-year course, page 40 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 forms 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 4 or to Plan 5. 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 the faculty. Their purpose is: (1) to provide as much general education as possible, (2) to provide a certain degree of professional specialization along the line of each student's particular interests.

FIRST YEAR*

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Engl. 4	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Engl. 5	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Engl. 6	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				

* See statement on page 30 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in preliminary English.

† For list of elective courses in other colleges, see page 73.

§ Students entering without previous college or professional experience should include Arch. 1-2-3, Introduction to Architecture, 1 cred. per qtr. In addition, foreign language, history, and a physical science are recommended. The normal program will accommodate French 1-2-3 or 4; History 1-2-3; Chemistry 1-2-3, or Chemistry 9-10; Geology 8; Geography 11; Physics 1-2. Students who have not had physics in high school should take Physics 1-2 in either the first or second year.

SECOND YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	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	2	.....	2	.....
Arch. 57	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 38	Structural Analysis and Design	3	.....	3	.....
	Electives†				
	Winter Quarter				
Arch. 52	History of Architecture	2	.....	2	.....
Arch. 58	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 39	Structural Analysis and Design	3	.....	3	.....
	Electives†				
	Spring Quarter				
Arch. 53	History of Architecture	2	.....	2	.....
Arch. 59	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 41	Structural Analysis and Design	3	.....	3	.....
	Electives†				

FOURTH YEAR

	Fall Quarter				
Arch. 54	History of Architecture	2	.....	2	.....
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	.....
	Winter Quarter				
Arch. 55	History of Architecture	2	.....	2	.....
Arch. 102	Building Materials and Methods	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
C.E. 171	Sanitary Engineering	2	.....	2	.....

† For list of elective courses in other colleges, see page 73.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Arch. 56	History of Architecture	2	.....	2	.....
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	.....

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†				

ARCHITECTURAL ELECTIVES

In addition to the courses listed above as required for the bachelor of architecture degree, the following elective courses are offered by the School of Architecture:

Course No.	Title	Credits
Arch. 1f-2w-3s	Introduction to Architecture, per quarter	1
Arch. 104f	Housing	3
Arch. 106s	Housing	2
Arch. 107f-108w-109s	Furniture and Decoration, per quarter	2
Arch. ID-If,w,s	Interior Design	24
Arch. DP-IIIf,w,s	Drawing and Painting, Grade III	6
Arch. DP-IVf,w,s	Drawing and Painting, Grade IV	6
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 elective courses offered in other colleges and departments, see page 73 of 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	6
Arch. 54-55-56	History of Architecture	6
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

† For list of elective courses in other colleges, see page 73.

Additional requirements:

Course No.	Title	Credits
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	108

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 38.

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 102 credits for the remaining two years:

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Arch. 51	History of Architecture	2	.....	2	.....
Arch. 57	Building Materials and Methods	2	.....	2	.....
Arch. 107	Furniture and Decoration	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
	Electives	5			
	Winter Quarter				
Arch. 52	History of Architecture	2	.....	2	.....
Arch. 58	Furniture and Decoration	2	.....	2	.....
Arch. 108	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
M.E. 3	Wood-Finishing	2	.....	.....	6
	Electives	3			
	Spring Quarter				
Arch. 53	History of Architecture	2	.....	2	.....
Arch. 59	Building Materials and Methods	2	.....	2	.....
Arch. 109	Furniture and Decoration	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
	Electives	5			

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Arch. 54	History of Architecture	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives	5			
	Winter Quarter				
Arch. 55	History of Architecture	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives	5			
	Spring Quarter				
Arch. 56	History of Architecture	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives	5			

CHEMISTRY AND CHEMICAL ENGINEERING

*Freshman and Sophomore Years**

FRESHMAN YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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. 19	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. 19	Survey of Manufacturing Processes	3	1	2	.....
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg.Chem. 12	Qualitative Analysis	5	2	1	6
Engl. 6	Composition	3	3	.....	.....
Draw. 8	Drawing and Descriptive Geometry	3	.....	.....	8
or					
M.E. 19	Survey of Manufacturing Processes	3	1	2	.....
G.E. 13†	Orientation	0	.....	1	.....

* See statement on page 30 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

† 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.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Inorg.Chem. 13	Qualitative Analysis	5	1	2	8
Phys. 7	General Physics	5	1	4	2
German 24§	Chemical German	3	4	.....	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Anal.Chem. 1	Quantitative Analysis	5	1	1	10
Phys. 8	General Physics	5	1	4	2
German 25§	Chemical German	3	4	.....	.....
	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	4	.....	.....
Chem.E. 80¶	Chemical Engineering Materials	1	.....	2	.....

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 pages 42 and 43.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Org.Chem. 51	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	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	Organic Chemistry	5	0	5	6
Phys.Chem. 103	Physical Chemistry	3	1	3	.....
Chem.E. 131	Inorganic Technology	4	1	5	.....
Phys.Chem. 106	Physical Chemistry Laboratory	2	1	.....	5
	Electives*				

* For list of elective courses in other colleges, see page 73.

§ Students who have had two years of high school German or one year of college German may take 27-28-29, three credits per quarter, instead of 24-25-26, three credits per quarter.

¶ Required of chemical engineers only.

SENIOR YEAR (See note below)

Course No.	Title	Credits	Rec.	Lect.	Lab.
	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	Inorganic Technology	4	.....	5	.....
	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	.....
	Electives*				
	Spring Quarter				
Inorg.Chem. 105	Advanced Inorganic Chemistry	3	.....	3	.....
	Electives*				

NOTE.—Near the close of the junior year, each student will choose a major adviser from the following list. 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.

LIST OF ADVISERS FOR SENIORS

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

Analytical Chemistry: Professors Kolthoff, Geiger, Meehan.

Organic Chemistry: Professors Smith, Koelsch, Lauer.

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

Chemical Engineering: Professors Mann, Montillon, Montonna, Rogers, 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 Doctor's 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 41. 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 41, 5 credits, in the winter or spring quarter of the junior year, if desired.

* For list of elective courses in other colleges, see page 73.

† For permissible substitute, see page 74.

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

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Bact. 41	General Bacteriology	5	.....	3	6
Bact. 121	Physiology of Bacteria	3	.....	3	.....
	Winter Quarter				
Bact. 122	Physiology of Bacteria	3	.....	3	.....
	Spring Quarter				
Bact. 123	Applied Bacteriology	3	.....	3	.....

Minor in Biochemistry

JUNIOR YEAR

	Fall Quarter				
Zool. 14†	General Zoology	3	.....	2	4
	Winter Quarter				
Zool. 15†	General Zoology	3	.....	2	4

SENIOR YEAR

	Fall Quarter				
Ag.Biochem. 113	Biochemical Laboratory Methods	2	.....	.....	6
Ag.Biochem. 119	Colloids	3	.....	3	.....
Bact. 41	General Bacteriology	5	.....	3	6
	Winter Quarter				
Ag.Biochem. 114	Biochemical Laboratory Methods	2	.....	.....	6
	Spring Quarter				
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
	Winter Quarter				
Min. 24	Elements of Mineralogy	4	1	2	4

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

† Nine credits in Botany may be substituted for Zoology 14,15.

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 physicochemical, 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 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 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, 143, M.E. 28, and Chem.E. 80. (Chem.E. 117 and 118 beginning 1940-41.)

For freshman and sophomore years see pages 42 and 43.

JUNIOR YEAR

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

† For permissible substitute, see page 74.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
Chem.E. 102	Unit Operations	6	4	2	4
Org.Chem. 52	Organic Chemistry	5	.....	5	6
Phys.Chem. 102	Physical Chemistry	3	1	3	.....
M.E. 38	Heat Engines	4	1	2	3
	Spring Quarter				
Chem.E. 103	Unit Operations	6	4	2	4
Org.Chem. 153	Organic Chemistry	5	.....	5	6
Phys.Chem. 103	Physical Chemistry	3	1	3	.....
Chem.E. 131	Inorganic Technology	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. 101	Physical Chemistry	3	1	3	.....
Phys.Chem. 104	Physical Chemistry Laboratory	2	1	.....	5
E.E. 43	Electric Power	3	.....	2	2
Chem.E. 101	Unit Operations	2	2	.....	.....
Chem.E. 121	Chemical Engineering Economics	3	.....	3	.....
Met. 160§	Metallography	3	.....	2	3
	Electives*				
	Winter Quarter				
Phys.Chem. 102	Physical Chemistry	3	1	3	.....
Phys.Chem. 105	Physical Chemistry Laboratory	2	1	.....	5
E.E. 44	Electric Power	3	.....	2	2
Chem.E. 102	Unit Operations	4	4	.....	.....
Met. 160§	Metallography	3	.....	2	3
	Electives*	7			
	Spring Quarter				
Phys.Chem. 103	Physical Chemistry	3	1	3	.....
Phys.Chem. 106	Physical Chemistry Laboratory	2	1	.....	5
E.E. 45	Electric Power	3	.....	2	2
Chem.E. 117	Chemical Engineering Equipment Design	3	2	1	4
Chem.E. 187	Chemical Engineering Inspection Trip	2	.....	.....	.....
	Electives*	9			

SENIOR YEAR

(This curriculum does not go into effect until 1940-41.)

	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	Organic Technology	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 73.

† For permissible substitute, see page 74.

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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
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	.....	1	6
Chem.E. 187	Chemical Engineering Trip	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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	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	Integral Calculus	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 73.

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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
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	6
	Electives*				
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
C.E. 16	Surveying	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			
	SENIOR YEAR				
	Fall Quarter				
C.E. 121	Railway Engineering	3	.....	1	6
C.E. 134	Statically Indeterminate Structures	3	2	.....	2
C.E. 141	Reinforced Concrete	3	2	.....	2
C.E. 161	Power	4	.....	2	6
C.E. 146 or	Plain Concrete	3	.....	2	4
G.E. 101	Contracts and Specifications	3	.....	3	.....
	Electives*				

* For list of elective courses in other colleges, see page 73.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
C.E. 131	Bridge Analysis	2	.....	1	3
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	Bridge Design	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 curicula. 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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	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 73.

† C.E. 137 limited to 20 students.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 25	Integral Calculus	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. 53	Elements of Preventive Medicine	3	3	.....	.....
G.E. 101	Contracts and Specifications	3	.....	3	.....
	Electives				
	Winter Quarter				
C.E. 162	Water Supply and Sewerage	3	.....	2	4
Bact. 41	General Bacteriology	5	.....	4	8
Econ. 167	Personnel Administration	3	3	.....	.....
M.E. 42	Power	4	2	2	.....
	Electives				
	Spring Quarter				
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
- Chemistry
- Physics
- Geology
- Mathematics

B. Social Sciences and Language
- Economics and Business
- Political Science
- Public Speaking
- English
- Modern Language

C. Engineering
- Surveying
- Highway Engineering
- Railway Engineering
- Structural Engineering
- 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, 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. 12, 16, 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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
M.E. 12	Forging, Heat Treating, and Welding	2	.....	1	4
E.E. 11	Elements of Electrical Engineering	3	2	1	.....
	Electives*				
	Winter Quarter				
M.&M. 25	Integral Calculus	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 73.

† For permissible substitute, see page 74.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
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. 16	Machine Shop Practice	2	.....	1	4
	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. 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 73.

† 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§

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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. 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 73.

§ 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 pre-business course* described on page 56 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, and is not eligible for the degree in business administration on this 74-credit basis unless *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 second 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 engi-

neering 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.

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 Pre-Business program.

Course No.	Title	Credits F	Credits W	Credits S
	Second Year			
Econ. 8f,w-9w,s	General Economics	3	3	.....
Econ. 28f,s	Business Law (8, 9)	.....	.....	3
	Third Year			
Econ. 29f,s†,26f,w,s	Principles of Accounting	3	3	.....
B.A. 77f,w,s	Survey of Marketing	.....	.....	3
	Fourth Year			
B.A. 58f,w,s	Public Finance (8, 9)	.....	3	.....
B.A. 70f	Statistics Survey (8, 9)	3	.....	.....
B.A. 71f,w,s	Transportation: Services and Charges (8, 9)	.....	.....	3
B.A. 87f,w,s†	Report Writing	1	.....	.....
B.A. 89f,w,s§	Production Management (8, 9)	.....	.....	3
B.A. 112f,w,s	Business Statistics (70)	.....	3	.....
B.A. 130f,s	Survey of Cost Accounting (29)	.....	.....	3
B.A. 142f,w,s	Money and Banking (8, 9)	3	.....	.....
B.A. 167f,w	Personnel Administration (161)	.....	3	.....
Econ. 161f,w,s	Labor Problems (8, 9)	3	.....	.....
	*Fifth Year**			
B.A. 91f,w,s†	Tabulating Equipment Laboratory (Econ. 26 and B.A. 70)	.....	1	.....
B.A. 155f,w,s	Corporation Finance (8, 9)	3	.....	.....
B.A. 101f,w-102w,s	Advanced General Economics (8, 9)	3	3	.....
B.A. 139f,w,s	Advanced General Accounting (26)	.....	.....	3
B.A. 165f,w,s	Economics of Public Utilities (8, 9)	.....	.....	3
B.A. 180-181-182Gf,w,s	Senior Topics: Production Management (89, 130)	3	3	3
Econ. 149f,w,s	Business Cycles (142)	.....	3	.....
	Total credits			74

ENGINEERING PRE-BUSINESS

(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, accompanied by instruction in business administration. Such positions are found in the fields of purchas-

* A comprehensive examination in the core group of economics and business administration courses is required for graduation in Business Administration.

† It is recommended that Econ. 20-25 be substituted for Econ. 29, B.A. 87, and B.A. 91.

§ 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.

ing, 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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 91†	Calculus	4	4	.....	.....
Phys. 7	General Physics	5	1	4	2
Econ. 8	General Economics	3	.....	3	.....
M.E. 15	Machine Shop Practice	2	.....	1	4
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,s)†	3
Materials Testing Laboratory (M.&M. 87f,s)†	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
Money and Banking—Advanced Course (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 58)	4

* For list of elective courses in other colleges, see page 73.

† For permissible substitute, see page 74.

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

¶ 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.

SENIOR YEAR§

(In the School of Business Administration)

	Credits
Transportation: Services and Charges II (Bus.Adm. 72f)	3
Cost Accounting (Bus.Adm. 130f,s)	3
Advanced General Economics (Bus.Adm. 101f,w-102w,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

Students may divide the time available for electives between Groups A and B.

A. General and Business

	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

B. Engineering

Auto and Airplane Engines (M.E. 50f,w,s)	3
Gas Manufacture and Distribution (Chem.E. 41s)	3
Civil Engineering Practice (C.E. 53s)	3
Contracts and Specifications (G.E. 101f,w)	3
Estimating (G.E. 81s)	3
Technical Writing (Engl. 36s)	3
Industrial Management Laboratory (M.E. 174f,w,s)	2

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
- Drawing
- Chemistry
- Mathematics
  - Algebra, Trigonometry, and Analytics
  - Differential and Integral Calculus
  - Differential Equations
  - Advanced Calculus
  - Technical Mechanics (Statics and Dynamics)
  - Elective topics in Mathematical Analysis 144-145-146
- Physics
  - General Physics 7-8-9
  - Theoretical Physics 101-103-105
  - Modern Exp. Physics 110-112 (individual work)
  - Experimental Optics 134
- Geophysics
  - Principles of Geophysical Prospecting 161-162

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

Geology
- General and Historical 1-2, A-B
- Mineralogy 23-24
- Sedimentation 101
- Rock Study 105
- Geology of Petroleum 112
- Structural Geology 124
- Map Interpretation 144-145
- Field Course 85

Elective
- Paleontology 51
- Economics 110
- Ore Deposits 111
- Advanced General 151-152-153
- Field Course 85

Mining
- Mining 131

Civil Engineering
- Surveying 11-12-13

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 31.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	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† or	Technical Discussions	3	3	.....	.....
M.E. 50†	Auto and Airplane Engines	3	3	.....	.....
	Electives*§				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
M.E. 6	Pattern Practice	2	.....	1	4
Engl. 37† or	Technical Discussions	3	3	.....	.....
M.E. 50†	Auto and Airplane Engines	3	3	.....	.....
	Electives*§				

* For list of elective courses in other colleges, see page 73.

† 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.

§ Programs are arranged to accommodate C.E. 17f,s Surveying; Chem.E. 1w, Power Plant Chemistry; and other electives. The Power Plant Chemistry section is limited to 20 students.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
M.E. 12	Forging, Heat Treating, 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*¶				
	JUNIOR YEAR				
	Fall Quarter				
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. 43	Steam Engineering	3	2	1	.....
M.E. 71	Machine Shop Practice	2	.....	2	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. 131	Thermodynamics	3	2	.....	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. 132	Thermodynamics	3	2	.....	3
	Electives*				
	SENIOR YEAR				
	Fall Quarter				
M.E. 121	General Engineering Design	2	.....	.....	6
M.E. 141§	Power Plant Engineering	3	3	.....	.....
M.E. 150§	Internal Combustion Engines	3	3	.....	.....
M.E. 171§	Production Control	3	3	.....	.....
	Senior Laboratory**	2 or 4	.....	.....	4 or 8
M.E. 160	Heating and Ventilation	3	1	2	.....
M.E. 190	Seminar	1	1	.....	.....
E.E. 36	Electric Power	3	2	.....	2
	Electives*				

* For list of elective courses in other colleges, see page 73.

† 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.

§ Courses M.E. 141, 150, 171 must be taken in the fall and winter quarters. Each course is offered both quarters.

¶ Programs are arranged to accommodate C.E. 17f,s, Surveying; Chem.E. 1w, Power Plant Chemistry; and other electives. The Power Plant Chemistry section is limited to 20 students.

** 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.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.E. 141§	Power Plant Engineering	3	3	.....	.....
M.E. 150§	Internal Combustion Engines	3	3	.....	.....
M.E. 171§	Production Control	3	3	.....	.....
	Senior Laboratory†	2 or 4	.....	.....	4 or 8
M.E. 191	Seminar	1	1	.....	.....
	Engineering Design¶	2	.....	.....	6
E.E. 37	Electric Power	3	2	.....	2
	Electives*				
	Spring Quarter				
M.E. 192	Seminar	1	.....	1	1
	Engineering Design¶	2	.....	.....	6
E.E. 38	Electric Power	3	2	.....	2
G.E. 193	Engineering Practice	2	.....	2	.....
	Senior Laboratory†	2 or 4	.....	.....	4 or 8
	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, METALLURGICAL, MINING, AND PETROLEUM ENGINEERING

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

FRESHMAN YEAR**

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Inorg.Chem. 14	General Inorganic Chemistry	4	1	3	3
Engl. 4	Composition	3	3	.....	.....
Draw. 11	Engineering Drawing	2	.....	.....	6
Geol. 11	Dynamic Geology	2	2	.....	.....
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Inorg.Chem. 15	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	.....	.....

* For list of elective courses in other colleges, see page 73.

† 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. 141, 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.

** See statement on page 30 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	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	.....	.....

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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 23	Mineralogy	4	1	3	4
M.&M. 31	Calculus	3	3	.....	.....
Met. 1	Assaying	2	.....	3	.....
Met. 2	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
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. 85	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 desposits, 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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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	.....	4	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			

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 61	Blowpipe Analysis	3	.....	2	4
Geol. 91	Index Fossils of North America	3	.....	1	6
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	6
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	6
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 specifications and problems 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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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	.....
	Electives	2			
	Summer Field Trip				
Min. 139	Study of mining operations, mine plants, and metallurgical plants in one or more western mining camps	6			

SENIOR YEAR

	Fall Quarter				
Geol. 110	Economic Geology	3	.....	3	.....
M.E. 9	Foundry Practice	2	.....	1	4
Met. 121	Ore Testing	2	.....	1	3
Min. 125	Mining and Metallurgical 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. 12	Forging, Heat Treating, and Welding	2	.....	1	4
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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Geol. 112	Petroleum Geology	3	.....	3	.....
Geol. 125	Structural Geology	3	.....	3	.....
M.E. 15	Machine Shop Practice	2	.....	1	4
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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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
	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			

SENIOR YEAR

	Fall Quarter				
Geol. 101	Sedimentation	3	.....	3	.....
Geol. 110	Economic Geology	3	.....	3	.....
Min. 125	Mining and Metallurgical 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. 12	Forging	2	.....	1	4
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. 15	Machine Shop Practice	2	.....	1	4
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 operation 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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
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	.....
Phys. 9	General Physics	5	1	4	2
	Elective	5			

JUNIOR YEAR

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

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
		Fall Quarter				
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	.....	1	4
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. 12	Forging, Heat Treating, and Welding	2	.....	1	4
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. 15	Machine Shop Practice	2	.....	1	4
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. 171	Study of metallurgical operations in important iron and steel centers	6			

SENIOR YEAR

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
		Fall Quarter				
A&B	Met. 121	Ore Testing	2	.....	1	3
A&B	Met. 134	Advanced Metallurgy	4	.....	3	4
A	Chem.E. 165	Gas and Fuel Analysis	3	1	1	4
A	Met. 153	Metallography	4	.....	3	4
A	Min. 125	Mining and Metallurgical Hydraulics	3	.....	3	.....
A		Electives	3			
B	Chem.E. 76	Applied Electrochemistry	3	.....	3	.....
B	Met. 141	Problems in Ferrous Metallurgy	3	.....	.....	9
	or					
B	Met. 166	Advanced Metallography Laboratory	3	.....	.....	9
B	Met. 163	Advanced Metallography	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	Metallography	4	.....	3	4
A&B		Electives	3			
B	Chem.E. 77	Applied Electrochemistry	3	.....	3	.....
B	Chem.E. 1	Power Plant Chemistry	3	1	1	4
B	Met. 142	Problems in Ferrous Metallurgy	3	.....	.....	9
	or					
	Met. 167	Advanced Metallography Laboratory	3	.....	.....	9
B	Met. 164	Advanced Metallography	3	.....	3	.....
		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	Metallography	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 Metallography Laboratory	3	.....	.....	9
B	Met. 165	Advanced Metallography	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 should consult an adviser in the Department of Physics who will aid him in selecting the sequences best adapted to his needs.

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.

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 55 credits.
A minor in mathematics of 34 credits.
A minor in chemistry of 39 credits.

The following outline is offered as a guide in planning the details of the four-year course. The student should consult his adviser in the choice of electives.

FRESHMAN YEAR†§

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
	Elective*				
	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
	Elective*				
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg.Chem. 11 or 16	Qualitative Chemical Analysis	4 or 5	.....	3	4 or 6
Engl. 6	Composition	3	3	.....	.....
Draw. 3	Descriptive Geometry	3	.....	.....	6
	Elective*				

SOPHOMORE YEAR

	Fall Quarter				
M.&M. 24	Differential Calculus	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	Integral Calculus	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	4	3	.....

* For list of elective courses in other colleges, see page 73.

† See statement on page 30 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

§ The course outlined for the freshman year for engineering groups (page 31) or for Chemistry and Chemical Engineering (page 42) may be substituted for the freshman program given here.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 151	Differential Equations	3	3	.....	.....
Phys.Chem. 101	Physical Chemistry	5	2	3	5
Phys. 71	Intermediate Physics	4	4	.....	.....
Phys. 107	Modern Physics	3	.....	3	.....
Phys. 144	Electrical Measurements	3	1	1	4
	Winter Quarter				
M.&M. 152	Advanced Calculus	3	3	.....	.....
Phys.Chem. 102	Physical Chemistry	5	2	3	5
Phys. 73	Intermediate Physics	4	4	.....	.....
Phys. 109	Modern Physics	3	.....	3	.....
	Elective*				
	Spring Quarter				
M.&M. 153	Advanced Calculus	3	3	.....	.....
Phys.Chem. 103	Physical Chemistry	5	2	3	5
Phys. 75	Intermediate Physics	4	4	.....	.....
Phys. 111	Modern Physics	3	.....	3	.....
	Elective*				

SENIOR YEAR

	Fall Quarter				
Phys. 101	Theoretical Physics	5	5	.....	.....
Phys. 134	Modern Experimental Physics	4	.....	.....	8
German 24	Chemical German	3	4	.....	.....
	Elective*				
	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. 111	Modern Physics	3	.....	3	.....
Phys. 112 or Elective	Modern Experimental Physics	4	.....	.....	8
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. 31f-32w	The English Novel, per quarter	3
Geol. 1f-2w	General Geology	6
Geol. Af-Bw	General Geology Laboratory	4
Hist. 1f-2w	European Civilization, per quarter	5

* For list of elective courses in other colleges, see page 73.

Course No.	Title	Credits
Hist. 4f-5w-6s	English History	9
M.&M. 84f,s	Technical Mechanics	5
M.&M. 154f-155w-156s	Vector Analysis, per quarter	3
M.E. 5f,w,s,su-8f,w,s-11f,w,s,su	Shop Practice, per quarter	2
Phil. 1f,w,s	Problems in 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. 62s	Logic in Science	3
Phys. 52w,s	Laboratory Arts	3
Phys. 61w	Introduction to Geophysical Prospecting	3
Phys. 113w	Intermediate Acoustics	3
Phys. 114f-116w-118s	Elementary Physical Investigation, per quarter	3
Phys. 124w	Pyrometry	3
Phys. 126s	Advanced Heat Laboratory	3
Phys. 134f,w	Experimental Optics	3
Phys. 136w,s	Spectrum Analysis	3
Phys. 137s	Electrical Properties of Crystals	3
Phys. 146w	Advanced Electricity Measurements	3
Phys. 152f	X-Rays	3
Phys. 154w,s	X-Ray Spectroscopy	3
Phys. 161f-162w	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
Sci. and Civ. 1f-2w-3s	Man in Nature and Society, per quarter	3
Zool. 1f-2w-3s	General Zoology	10

ADDITIONAL ELECTIVE COURSES

For detailed schedules of classes see the programs of the respective departments in the Combined Class Schedule for 1939-40.

Course No.	Title	Credits	Prerequisites
Ast. 11f,s	Descriptive Astronomy	5	None
Fine Arts 1f	History of Architecture to 1870	3	None
Fine Arts 2w	History of Modern Architecture and Sculpture	3	None
Fine Arts 3s	History of Painting	3	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
Geog. 43f	Political Geography	5	Soph., jr., sr.; none
Geol. 8f,w,s	Introductory Geology	5	None
Geol. 27s	Outlines of Mineralogy	1	Jr., sr.; 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. 2 or two years high school German
Ger. 4f,w,s	Intermediate German	5	Ger. 3 or three years high school German
Greek 42s	Greek Sculpture	2	None
Hist. 1f,w-2w,s	European Civilization	10	None
Hist. 3s	Social and Economic History of Modern Europe	5	10 cred. in hist. if taken by freshmen
Hist. 4f-5w-6s	English History	9	None
Hist. 7f-8w-9s	American History	9	Soph., jr., sr.; none
Hist. 11f-12w-13s	Medieval History	9	None (arch. only)
Italian-1f-2w	Beginning Italian	10	None

Course No.	Title	Credits	Prerequisites
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. 61w	Philosophy of Science	3	Phil. 2
Phil. 62s	Logic of Science	3	Phil. 2 or 61
Pol.Sci. 1f,2w,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,s	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

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
Draw.	7	3	Draw.	1 and 2	6
	8	3		3	3
	11	2		1	3
	12	2		2	3
	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

DESCRIPTION OF COURSES

AERONAUTICAL ENGINEERING

1f—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. Barlow and Brush.

(1) I MWF; 105A
(2) II TThS; 105A
(3) I TThS; 105A
(4) VI MWF; 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.; prereq., 1. Messrs. Barlow and Brush.

Lect. (1) I TTh; 105A
(2) II MTh; 105A
(3) III TTh; 105A
(4) II TS; 105A

Lab. (1) I-II F; A
(2) VIII-IX M; A
(3) VI-VII M; A
(4) I-II Th; A

Quiz I S; 335EE

3s—Aeronautics. Instruments. Meteorology. Avigation. 3 cred.; prereq., 1 and 2. Messrs. Barlow and Serebreny.

(1) I TThS; 105A
(2) II TS, III Th; 105A
(3) VI MThF; 105A
(4) VIII MWF; 105A

83s—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. Mr. Wise.

(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. Mr. Boehnlein.

100f (1) III TThS; 110Ex
(2) VI MWF; 205E
101w (1) I TThS; 104E
(2) II MWF; 205E
102s (1) I MWF; 104E
(2) I TThS; 104E

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. Mr. Wise.

Lect. II TS; 227E
Lab. III-IV F; 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. Mr. Wise.

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, Barlow, Brush, and Ruszaj.

120f Lect. (1) VI T, II F; 105A
(2) IV TS; 105A
Lab. (1) II-IV W; 251ME
(2) II-IV W; 255ME
(3) II-IV F; 251ME
(4) II-IV F; 255ME

121w Lect. (1) IV T, III S; 105A
(2) VI W, VII F; 105A
Lab. (1) II-IV WF; 251ME
(2) II-IV WF; 151ME
(3) VII-IX T, II-IV S; 251ME
(4) VII-IX T, II-IV S; 151ME

122s Lect. IV T; 105A
Lab. (1) II-IV MF; 251ME
(2) II-IV MF; 255ME

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, Barlow, and Brush.

126f,w,s-127f,w,s-128f,w,s—Advanced Problems in Airscrew Design. Graphical and analytical methods of investigation. 2 to 5 cred. per qtr.; prereq., 122. Mr. Akerman.

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

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

141w—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., 102. Messrs. Boehnlein and Ruszaj.

Lect. (1) IV S; 201Ex (2) III T; 201Ex
Lab. (1) VII-IX TF; Ex (2) VII-IX WTh; Ex (3) VII-IX M, I-III Th; Ex

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—Airships. Theory and design. Rigid and non-rigid types. Stresses. Performance. 3 cred.; prereq., 83, 102, M.&M. 128. Messrs. Akerman and Piccard.

Lect. III T, IV S; 105A
Lab. (1) II-IV W; 251ME (2) II-IV W; 255ME

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. Messrs. Brush and Serebreny.

(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 Serebreny.

174—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; I MWF; 105A; VII-IX Th; 205A. Mr. Serebreny.

175s—Advanced Meteorology. Use of the thermodynamic charts. Construction and use of isentropic charts. Isobaric analysis and weather forecasting pro-

cedure 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. Mr. Serebreny.

190w-191s-192f,w,s—Seminar. Readings, reports, conferences, and discussions. 1 cred. per qtr.; prereq., 101. Messrs. Akerman and Piccard.

190w	(1) VII M; 105A	(3) VII W; 105A
	(2) III M; 105A	(4) IV M; 105A
191s	(1) III S; 105A	(3) VI W; 105A
	(2) VII M; 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, Barlow, Boehnlein, Brush, Serebreny, and Swanson.

201f-202w-203s—Advanced Aerodynamics. 3 cred. per qtr.; prereq., 102 or special permission. Mr. Boehnlein.

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. Mr. Wise.

272f-273w-274s—Research in Aeronautical Engineering. 2 to 5 cred. per qtr.; grad. Messrs. Akerman, Piccard, Robertson, 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.

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.

Aircraft Radio see Electrical Engineering 46, 47, and 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; 201 SnH(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; II 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; III MWF; 113SnH(UF). Mr. Bailey.

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 Organization. The field of farm management; farming as a business; types of farming; selection and acquisition of a farm; planning the physical layout; selecting the crops and livestock. Special attention given to fundamental principles of organization. 3 cred.; prereq., Agr.Econ. 1, 2 or Econ. 8, 9; II TThS; 312HH(UF). Mr. Pond.

103s—Farm Operation. Budgeting the farm business; factors affecting success in farming; utilization of labor, power, and machinery; use of capital and credit; farm management investigations and services. Special attention to finding and remedying weaknesses in farm organization and operation. 3 cred.; prereq.; Agr.Econ. 1, 2 or Econ. 8, 9; II TThS; 312HH(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 TS; 41En(UF)
Lab. II-III TS; 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. 3. Mr. Neubauer.
Lect. I T; 103En(UF)
Lab. ar.; 103En(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. 3 cred.; prereq., 5, 7, 53, M.&M. 128. Messrs. White and Neubauer.
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, cost, and efficiency of farm buildings. 2 to 6 cred. per qtr.; prereq., 67; ar.; 305En(UF). Messrs. White, Christopherson, and Neubauer.

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)

43s—Mechanical Laboratory. Instruction and laboratory practice in mechanical work, embracing cement work; soldering; welding; pipe fitting; electric wiring; harness repair, etc. 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. VII WF; 216En(UF)
Lab. VII-IX M; 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-VII T; 105En(UF); VI-VIII Th; 49En(UF). Mr. Schwantes.

72s—Applied Electricity. Laboratory work in direct and alternating current machines as used on farms, including generators, motors, storage batteries, transformers, and complete isolated electric and hydroelectric plants. (Offered only in alternate years, 1939-40, etc. Alternate with Ag.E. 73.) 3 cred.; prereq., Phys. 9 or 43, 44. Mr. Hustrulid.
Lect. III MF; 101En(UF)
Lab. VI-IX W; 37En(UF)

73s—Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. 3 cred.; prereq., M.E. 31 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 and Neal.
Lect. VI F; 105En(UF)
Lab. VI-VIII MW, VII-IX F; 305En(UF)

28w—Land Clearing. Land clearing methods, machinery, and care and use of explosives. (Offered only in alternate years, 1939-40, etc.) 3 cred.; no prereq.; I TThS; 105En(UF). Mr. Schwantes.

51w—Land Reclamation. Principles and practices of soil erosion control, land drainage and irrigation in relation to plant growth, farm operation, land development, and community interest. (Offered only in alternate years, 1939-40, etc. Alternate with Soils 108.) 5 cred.; prereq., 21 or reg in 21, Soils 6, M.&M. 129 and 143 or reg. in M.&M. 129 and 143; VI MTWThF; 105En(UF). Messrs. Roe, Neal, 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 and Neal.

201f-202w-203s—Reclamation Research. Studies of design and functioning of 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. Mathematical Theory of 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; 107En(UF). Mr. Johnson.

ANIMAL AND POULTRY HUSBANDRY

50s—Fundamentals of Livestock Production. Basic principles involved in the breeding, feeding, and management of livestock. 3 cred.; jr., sr.; no prereq.; I TThS; 3St(UF). (For professional agricultural engineering students only.) Mr. Peters.

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. The more significant architecture of the past, with particular reference to the geographic, social, and technical influences which produced it. 2 cred. per qtr.; prereq., jr. standing; IV TF; 320E. Mr. Robb.

54f-55w-56s—History of Architecture (continued). 2 cred. per qtr.; prereq., 53; IV MW; 320E. Mr. Robb.

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.

101f-102w-103s—Building Materials and Methods (continued). 2 cred. per qtr.; prereq., 59; III TTh; 320. 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, Filipetti, Vaile, and Ludwig.

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.

107f-108w-109s—Furniture and Decoration. Principles, methods, and materials involved in the furnishing and decorating of interiors. 2 cred. per qtr.; prereq., consent of instructor; II TTh; 320E.

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 as 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. Heath (Construction), Mr. Huchthausen (Decoration).

AD-IIf,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 (Decoration).

AD-IIIf,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 critic, Mr. Arnal (Composition); consulting critic, Mr. Robert Jones (Construction).

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 (Composition and Decoration); consulting critic, Mr. Heath (Construction).

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. Messrs. Young and Huchthausen.

DP-If (1) II-III MF; 417E (for beginners only)
(2) VI-VII TTh; 417E (for beginners only)
(3) VI-VII MF; 417E (for students with at least one quarter's experience)

‡ 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-Iw,s (1) II-III MF; 417E (for students with at least one quarter's experience)
(2) VI-VII TTh; 417E (for students with at least one quarter's experience)
(3) VI-VII MF; 417E (for beginners only)

DP-IIf,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. Messrs. Young and Huchthausen.
(1) II-III TTh; 417E
(2) VI-VII TTh; 417E

DP-IIIf,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.

DP-IVf,w,s‡—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-Vf,w,s—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,w,s‡—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,w,s—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-IIf,w,s‡—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-IIIf,w,s—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-VII MTh; 417E. Mr. Young.

IHP-IIw,s—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-VII 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.

* 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.

BACTERIOLOGY AND IMMUNOLOGY

41f,w,s,su‡—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., 41, and 15 cred. in chemistry; 9 hrs.; 5 cred.; I-III TThS; MH. Dr. Skinner.

114s—Molds, Yeasts, and Actinomycetes. 4 cred.; prereq., Bact. 41; 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., 41 and 8 cred. of organic chemistry or biochemistry; III TThS; MH. Mr. Halvorson.

123s—Applied Bacteriology. Industrial fermentations; bacteriology of water and sewage; interpretation of bacteriological data. 3 cred.; prereq., 121-122; III TThS; MH. Mr. Halvorson.

150f-151w§—Advanced Bacteriology. 6 cred.; prereq., 41, 103, 114; 8 hrs.; VI-IX TTh; MH. Dr. Henrici, 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 T	(6) IV T
		(2) II T	(7) V T
		(3) II Th	(8) V Th
		(4) III M	(9) VI M
		(5) III W	
1w,s	Lect. III TThS; Bot. Aud.		
	Quiz Bot. Aud.	(1) I T	(4) III M
		(2) II T	(5) IV M
		(3) II Th	(6) IV T

CHEMISTRY

INORGANIC CHEMISTRY

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

1f,su-2w—(Agr., arch., predent., premed.) 1. 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

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

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

1f (Agr. only. Not offered to less than 30 students.)
Lect. VI MWF; 225C
Quiz VIII F; ar. C
Lab. VIII-IX MW; 210C

1f-2w (Agr. and arch.)
Lect. VII MWF; 325C; VIII F; ar. C
Lab. VIII-IX MW; 210C

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

(Predent. and premed.)
Lect. VI MWF; 225C
Lab. VI-IX Th; 290C

(Agr.)
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-3s. 4 cred. per qtr.; prereq., high school chemistry. Messrs. Reyerson, Heisig, and Maynard.

4f (Engrs. and miners)
Lect. IV TS, III Th; 100C — Quiz VIII F; 100C, 305E
Lab. (1) I-III T; 110C — (3) I-III F; 110C
(2) II-IV W; 110C

Engineering students doing unsatisfactory work in this course will be required to take 2 additional hours; IX TF; 225, 325C.

(Premed.)
Lect. VI MWF; 100C — Quiz VI T; 100C
Lab. VII-IX T; 210C

(Predent., med. tech.)
Lect. VII MWF; 225C — Quiz VI Th; 100C
Lab. VII-IX Th; 210C

5w (Engrs. and miners)
Lect. IV TS, III Th; 100C — Quiz IX T; 100C
Lab. (1) I-III T; 110C — (3) I-III F; 110C
(2) II-IV W; 110C

(Premed.)
Lect. VI MWF; 100C — Quiz VI T; 100C
Lab. VII-IX T; 210C

(Predent., med. tech.)
Lect. VII MWF; 225C — Quiz VI Th; 100C
Lab. VII-IX; Th; 210C

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; 225C; I Th; 410C
Lab.§ (1) I-III T, II-III Th; 210C — (2) I-II TS, II Th; 210C

8s*—Qualitative Chemical Analysis (S.L.A. and pharm.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, and reduction, etc. 5 cred.; prereq., 7. Miss Cohen.

Lect. II MWF; 225C
Lab. (1) I-II TThS; 210C — (2) I-III TTh; 210C

* To be followed by Course 13, not 12.

§ 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.

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	(2) III MWF; 410C
	Lab.	(1) VI-VII MWF; 210C, 290C	(2) VI-VII MWF; 290C

11f,s,su†—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. 4 cred.; prereq., 3 or 5. Mr. Reyerson, Miss Cohen, and Mr. Maynard.

11f	Lect. IV MWF; 225C	Lab. VI-IX F; 210C
11s	(Premed.) Lect. VI MWF; 100C	Lab. VI-IX T; 210C
	(Predent., med. tech.) Lect. VII MWF; 225C	Lab. VI-IX Th; 210C

12f,s,su†-13f,w¶—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, reduction, etc. 5 cred. per qtr.; prereq., 8 or 10. Messrs. Sneed, Heisig, and Taylor.

12f	Lect. I TThS; 225C	Lab. I-III MW; 290C
12s	Lect. II MWF; 100C	
	Lab. (1) I-III ThS; 290C	(2) I-III TTh; 290C
13f	Lect. VI MW; 325C	Quiz VI F; 410C
	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. without high school chem. and all miners.) 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—Qualitative Chemical 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. 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
(Engrs. who entered with high school chem. and all miners.)
Lect. IV TS, VI Th; 225C
Lab. (4) VI-VIII TW; 110C

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

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

¶ Students who have completed Course 8 should omit Course 12 and take Course 13.

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., Org. Chem. 52 or permission of instructor. Miss Cohen.

102s‡—Semi-micro 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. Discussion of the periodic system and the chemistry of the elements and their compounds and of special subjects of inorganic chemistry such as valency, oxidation and reduction, complex ions, etc. 3 cred. per qtr.; prereq., Anal. Chem. 1, 2, Org. Chem. 52; II TThS; 115C (f), 215 (w), 111C (s). Mr. Sneed.

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., 13; 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.; VII-IX W; 10C. Mr. Greinke.

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. 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. 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. Barber, Heisig, Klug, and Maynard.

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.

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; 111C (3) VII W; 111C
(2) VIII W; 111C
Lab. (1, 2) any 9 hrs. on MWF afternoons (3)w I-IV T, I-III Th, I-II S; 310C
(3)s I-IV T, VII-IX T, I-II S; 310C

7f,s,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. 8, 11, 12, or 16. Messrs. Geiger and Meehan.

7f 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
7s Lect. VI T; 325C
Rec. VI Th; 325C
Lab. VII-IX TTh, I-III or II-IV S; 310C

9w—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. 8, 11, or 16. Mr. Meehan.

Lect. VI Th; 325C
Rec. VI T; 325C
Lab. VII-IX TTh; 310C

96f,su-97w-98s—Senior Thesis. 5 cred. per qtr.; sr. Messrs. Kolthoff, Geiger, Sandell, and Meehan.

101w-102s—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.

103f‡—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.

104s‡—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.

105w‡—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.

106f-107w-108s‡—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.

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.

* Registration limited. Obtain permission of instructor.
‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

122f—Advanced Analytical Chemistry. Condensed review of modern fundamentals of gravimetric and volumetric analysis. 1-2 cred.; 1 lect. ar.; 1 rec. ar.; 3-6 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.

127w‡—Use of Organic Reagents in Analytical Chemistry. Use of organic reagents in the detection and quantitative determination (gravimetric, volumetric, and colorimetric) of cations and anions. 3 cred.; prereq., 1, 2 and Org. Chem. 52; 1 lect., 6 hrs. of lab. 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.

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. ar.; lab. ar. Mr. Kolthoff.

138s‡—Advanced Gravimetric Analysis. Course in the formation, properties of and coprecipitation with ionic lattices. 2 to 3 cred.; prereq., Phys. Chem. 103; 2 lect. ar.; lab. 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.

204s—Modern Theories of Acidity and Basicity. 2 cred.; prereq., Phys. Chem. 103; ar. 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; 225C(f), 325C(w)
	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; 325C
	Lab.	conference V T; 100C, 325C, 410C
	Quiz	IV T; 410C, and ar
	Lab.	(1) VI-IX W; 390C
		(2) VI-IX Th; 390C
		(3) I-IV S; 390C

* For permissible substitute see page 74.

† 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.

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 chemistry. Messrs. Smith, Lauer, and Arnold.

Lect. III MWF; 100C
Lab. conference (f,w) III Th, 325C, 410C; III S, 100C
(s) III Th, I S; 100C
Lab. (1) II-IV, VI-VIII T; 390C
(2) VI-VIII TTh; 390C
(3) VI-VIII WF; 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. of chemistry; 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; 225C. 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 semi-micro 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-142w-143s—The Chemistry of Natural Products. Discussion of the organic chemistry of important classes of natural products. 3 cred. per qtr.; prereq., 153; 140f (Aromatic Compounds) IV MWF; 315C. Mr. Koelsch. 142w, I MWF; 315C; 143s, I MWF; 215C. Messrs. Lauer and Arnold.

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. (Not offered in 1939-40.)

153s—See 51f-52w-153s.

156s—See 54f-55w-156s.

201f-202w-203s—Organic Chemistry Seminar. 1 hr. per week. 1 cred. per qtr.

† 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.

‡‡ A charge of $10 is made to cover special chemicals in this course.

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 1939-40.)

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 calc., or permission of the instructor. (Not offered in 1939-40.)

301f-302w-303s—Research in Organic Chemistry. Cred. ar.; prereq., 110. Messrs. Smith, Koelsch, Lauer, 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., 2 yr. coll. chem., 1 yr. coll. phys. Knowledge of calculus is advisable. Messrs. MacDougall, Livingston, and Hull.

Lect. IV MWF; 100C
Rec. (1-2) IV S; 325C, 410C
Rec. (3) III S; 225C

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
(2) VII-VIII T, VI-VIII Th; 190C
(3) VI-VIII F; 190C

107f-108w‡—Elementary Physical Chemistry (Premed.). 4 cred. per qtr.; prereq., 2 yr. coll. chem., 1 yr. coll. phys. Messrs. Glockler and Hull.

Lect. III MWF; 225C
Rec. VIII T; ar.
Lab. (1) I-III T; 190C
(2) I-III Th; 190C

109su‡—Elementary Physical Chemistry (Premed.). 8 cred., equiv. to 107f-108w.

113f—Fundamentals of Reaction Kinetics. Order of reaction, collision theory, activation, chain reactions especially in gaseous systems. 3 cred.; prereq., 103. Mr. Livingston.

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. Modern theory of the atom and the molecule on the principles of wave mechanics with an introduction based on Bohr theory. 3 cred.; prereq., 103 and calculus; II TThS; 215C. Mr. Glockler.

117w—Advanced Physical Chemistry. Application of thermodynamics to chemical problems, free energy calculations by classical methods and by the use of spectroscopic data. 3 cred.; prereq., 103 and calculus; II TThS; 225C. Mr. Glockler.

118s—Advanced Physical Chemistry. Physical chemistry of the solid state on the basis of modern concepts. 3 cred.; prereq., 103 and calculus; II TThS; 215C. Mr. Glockler.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

128f-129w-130s—Colloid Chemistry. General survey of surface chemistry, adsorption, catalysis, electrokinetic phenomena, lyophilic and lyophobic colloids. 2 cred. per qtr.; prereq., 103. (Not offered in 1939-40.)

131f-132w-133s‡—Colloid Chemistry Laboratory. Cred. and hrs. ar. Must be preceded or accompanied by 128, 129, or 130. Mr. Reyerson.

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 adsorption spectra of molecular gases. 3 cred.; prereq., 103 and Phys. 33. Mr. Livingston.

180f—General Survey of Colloid Chemistry. 3 cred.; prereq., 103; IV MWF; 115C. Mr. Freundlich.

181w—Colloids in Industry. 3 cred.; prereq., 180 or 128-129; IV MWF; 115C. Mr. Freundlich.

182s—Colloids in Biology and Medicine. 3 cred.; prereq., 180; IV MWF; 115C. Mr. Freundlich.

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 1939-40.)

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. Messrs. Freundlich, 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.

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 structures. Cred. ar. Messrs. MacDougall, Freundlich, Glockler, Kolthoff, Lind, Reyerson, Livingston, Klug, and Hull.

CHEMICAL ENGINEERING

1w,s‡—Power Plant Chemistry. (M.E. and Min.E.) Proximate analysis of coal, determination of calorific power; technical analysis of flue gases and furnace gases. 3 cred., prereq., Inorg. Chem. 16. Mr. Stoppel.

1w Lect. III T; 215C
Rec. III Th; 215C
Lab. II-IV MF; 10C
1s Lect. and rec. ar.
Lab. (6 hrs. afternoon) ar.

31s—Chemistry of Engineering Materials. Application of general chemistry in engineering practice. Technology and properties of wood, iron, and steel,

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

alloys, fuels, water, cements, coating materials, 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 yr. chem. and one yr. phys. 3 cred. per qtr. Mr. Piret.

Lect. III TTh
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, cement, and ceramic materials; textiles; rubber; protective materials, etc. 1 cred.; prereq., Inorg. Chem. 13; II TS; 225C. Mr. Rogers.

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 industrial stoichiometry. 3 cred. for jr., 2 cred. for sr. without lect.; prereq., 80, Anal. Chem. 1, 2. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I TS; 325C
Rec. (1) I MTh; 115C
(2) I MTh; 111C
(3) II WS; 315C
(4) II WS; 111C
(5) I WF; 111C (seniors only)
(6) I W; 115C (seniors only)

102w‡—Unit Operations. Continuation of 101f with discussions on fluid flow, filtration, heat transfer. Their applications including economic balance and the solution of problems. Lectures, recitations, and laboratory. 6 cred.; prereq., 101. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I TF; 325C
Rec. (1) I MWThS; 111C
(2) I MWThS; 115C
(3) II MTThF; 111C
(4) II MTThF; 115C
(5) II MWF; 315C; Th; 323C (seniors only)
(6) II MWF; 410C; Th; ar (seniors only)
Lab. (1) VI-IX M; 90C
(2) VI-IX T; 90C
(3) VI-IX W; 90C
(4) VI-IX F; 90C

103s‡—Unit Operations. Continuation of 101 and 102. Discussions and problems of evaporation, humidification and air conditioning, drying, distillation, absorption, extraction, and crystallization. 6 cred.; prereq., 102. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I TF; 325C
Rec. (1) I MWThS; 115C
(2) I MWThS; 315C
(3) I MWThS; 410C
(4) I MWThS; 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, calculation of heat and material balance, specific uses, and furnaces. Lectures, recitations, laboratory. 4 cred.; prereq., Anal. Chem. 1, 2. Messrs. Rogers, Stoppel, Grove, and Piret.

Lect. I WF; 410C
Rec. (1) II W; 115C; S; 325C
(2) II W; 410C; S; 225C
(3) I MTh; 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

* Each laboratory section is limited to 16 students.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

106f‡—Petroleum and Petroleum Products. Technology and testing of petroleum products, principally gasoline, lubricating oils, and fuel oils. 3 cred.; prereq., Org. Chem. 51. Mr. Stoppel.
Lect. III MWF; 325C
Lab. (1) VI-IX F; 10C
(2) VI-IX W; 10C

107w—Petroleum Refinery Engineering. Unit operations and chemical engineering design principles and calculations involved in the manufacture of the principal petroleum products. Production of motor fuel by extraction from natural gas, distillation of crude oil, cracking and re-forming and by polymerization. Other operations as dewaxing, solvent refining, treating, and sweetening, are considered. Lectures. 3 cred.; prereq., 103 or permission of instructor; III MWF; 215C. Mr. Rogers.

108w—Unit Operations Problems. Advanced problems in distillation, absorption, extraction, crystallization. Discussion and equipment used. 3 cred.; prereq., 103; III MWF; 111C. Mr. Grove.

109s—Unit Operations Problems. Advanced problems in heat flow. Discussions and equipment used. 3 cred.; prereq., 103; III MWF; 111C. Mr. Grove.

110s*‡—Special Analytical Apparatus. The use of special apparatus for chemical and physical testing of chemical products including gas apparatus, calorimeters for gases, liquids and solids, optical apparatus, viscosimeters, turbidimeters, etc. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Stoppel.
Lect. II Th; 315C
Lab. VI-VIII MW; 10C

111f-112w-113s—Chemical Engineering Plant Design. Planning of plants and design of equipment based on collected data for the same. Classroom and laboratory work. 2 cred. per qtr.; prereq., 104. Mr. Montillon.

117w,s-118s†—Chemical Engineering Equipment Design. Fundamental principles in the design of simple chemical engineering equipment. Lectures, recitation, laboratory. 3 cred.; prereq., 103. Messrs. Montonna, Rogers, and Grove.
117s Lect. IV T; 410C
Lab. (1) VI-IX TTh; 410C (2) VI-IX TTh; 443C

120f‡—Chemical Engineering Thermodynamics. A study of the principles of the three fundamental laws of energy as applied to chemical engineering problems. 3 cred.; prereq., 103; III MWF. Mr. Rogers.

121f—Chemical Engineering Economics. The economic and business considerations controlling chemical engineering industries. Statistical analysis of these industries. Raw and finished products. Principles of plant location, layout, and design. Unit operation costs. Principles of management, operation, and control. 3 cred.; prereq., 131; II MWF; 325C. 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 alkalies, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. 4 cred.; prereq., (for chem. engrs.) 102; (for chem.) Anal. Chem. 1, 2; II MWThFS; 325C. Mr. Mann.

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,

* For permissible substitute, see page 74.
† 117w,118s Chemical Engineering Equipment Design will not be given in 1939-40.
‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

sugar, starch, etc. 4 cred.; prereq., (for chem. engrs.) 101; (for chem.) Org. Chem. 52; I MWThF, III S; 325C. 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., 132. Mr. Montonna.

134f—Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. 3 cred.; prereq., 132 or equiv. (may be accompanied by laboratory work in 160) (Not offered in 1939-40.)

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. 52 or equiv.; I MWF; 215C. 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.; prereq., Org. Chem. 52. 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., 101. Messrs. Montonna and Grove.

152w,su*‡—Chemical Manufacture (Organic). Similar to 151 but covering the unit organic processes. Laboratory. 3 or more cred.; prereq., 101. Messrs. Montonna and Grove.

153f-154w-155s-156su—Special Laboratory Problems. Investigations on chemical engineering equipment and its use in the manufacture of special chemical products on a semi-works scale. 3 or more cred. per qtr. Messrs. Mann, Montillon, and Montonna.

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., 132, 152 and preceded or accompanied by 134. Mr. Montonna.

165f,w‡—Fuel and Gas Analysis. (For engineers—except chemical.) Chemical analysis of solid and gaseous fuels with determination of calorific values and an interpretation of results. 3 cred.; prereq., analytical chemistry. Mr. Stoppel.

165f	Lect.	I T; 111C
	Rec.	IV F; 111C
	Lab.	VI-IX M
165w	Lect.	II T; 315C
	Rec.	II Th; 315C
	Lab.	VI-IX M

* Required for chemical engineers during Summer Session.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

168s‡—Petroleum and Petroleum Products. (Miners.) Technology and testing of petroleum and petroleum products. 3 cred.; prereq., Anal. Chem. 9. Mr. Stoppel.

Lect. I M; ar.
Rec. I W; 325C
Lab. VI-IX W; 10C

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 taken simultaneously. Mr. Montillon.

Lect. III MWF; 115C
Lab. VI-VIII W or Th; 25C

179s—Applied Electro-Organic Chemistry. Theory and practice of the electrochemistry of organic compounds. Lect. and rec., 3 cred.; lab. 1 or 2 cred. optional; prereq., 176-177; III MWF; 115C. Mr. Mann.

187s—Inspection 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., 104. Open to graduate students only. (Not offered in 1939-40.)

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. Mr. Montillon.

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, Rogers, 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 T, 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, Zelner, 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

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

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; 217E (3) II-IV T, 217E; I-IV S; 4E
(2) VII-IX M; 217E; VI-IX W; 7E

14f—Surveying. Complete topographical survey, stadia method, is made and platted. 3 cred.; prereq., 13. Mr. Zelner.

(1) VI-IX WF; 21, 217E (3) VI-IX TTh; 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

17f,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 TW; 21E
(2) I-IV MW; 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, 7E
109s V MF; 206E

110f,w—Errors in Surveying. Studying 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) VI-IX F; 229E (2) VI-IX 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 TTh; 225E (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, cross-overs, 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. Mr. Wise.
Lect. I TTh; 107E
Lab. (1) VIII-IX M; 229E (2) VII-VIII F; 229E

32w—Stresses in Structures. Analysis of simple span bridge trusses. Standard engine loadings and equivalent uniform loads. 3 cred.; prereq., 31. Mr. Wise.
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. Mr. Wise.
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.) Analysis of stresses in simple structural frames. Design of roof trusses, crane girders, mill building bent. 3 cred.; prereq., M.&M. 26 or 84. Mr. Hughes.
Lect. VI MT; 227E
Lab. VI-IX Th; 217E

38f-39w-41s—Structural Analysis and Design. (Arch.) Analysis and design of structures of steel, timber, and reinforced concrete. 3 cred.; prereq., M.&M. 26, 84, or 93; I MWF; 201Ex(f), 320E(w,s). Mr. Andersen.

131w-132s—Bridge Analysis and Design. Stresses in cantilevers, arches, and continuous bridges. Design and detail of typical bridge structure. 2 cred. per qtr.; prereq., 134. Mr. Wise.

131w VI Th; 227E; VII-IX Th; 225E
132s II W; 227E; VII-IX Th; 225E

134f—Statically Intermediate Structures. Theory of deflections and statically indeterminate stresses and their application to continuous girders, frames, swing bridges, and redundant members. 3 cred.; prereq., 33, M.&M. 128. Mr. C. A. Hughes.

Lect. VI TF; 227E
Lab. VIII-IX M; 225E

135w—Advanced Structural Design. 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., 134. Mr. Andersen.

137w,s—Structural Laboratory. Theoretical and experimental analysis of structural members and models. 2 cred.; prereq., 134, 141. (Limited to 15 students each section.) Mr. C. A. Hughes.

137w Lect. VI F; 201Ex
Lab. (1) VII-IX W; Ex (2) VII-IX F; Ex
137s Lect. II M; 201Ex
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., M.&M. 128; I-II S, 225, 229E; VI MTh, 227E. Mr. C. A. Hughes.

142w—Reinforced Concrete Design. Continuation of 141 with special emphasis on the practical features of the design of buildings, bridges, retaining walls, etc. 3 cred.; prereq., 141; VI M, III F, 227E; VI-VII T, 225E. Mr. C. A. Hughes.

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,s—Plain Concrete. Theory of 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. Mr. Andersen.

146f Lect. IV MW; 227E 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, M.&M. 128; III TS; 227E. Mr. Andersen.

148f-149w-150s—Advanced Concrete. Short research problems in concrete. 2 cred. per qtr.; prereq., 146; ar. Mr. C. A. Hughes.

180f-181w-182s—Advanced Structural Laboratory. Special problems. 3 to 5 cred. per qtr.; prereq., 137. Mr. C. A. Hughes.

233s—Advanced Problems in Foundations. Lateral earth pressure theories. Design of sheet piling. Bearing piles and cofferdams. 3 to 5 cred.; prereq., 134, 147; IX T; IV S. Mr. Andersen.

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. Mr. Wise.

236s—Advanced Reinforced Concrete Designs. Effect of shrinkage and plastic flow. Eccentrically loaded concrete sections. Nonsymmetrical bending. Torsion. 3 to 5 cred.; prereq., 135 or 142. Mr. Andersen.

245f-246w-247s—Seminar. Special topics in the higher theory of structures. 3 to 6 cred. per qtr.; prereq., 134, 142. Messrs. C. A. Hughes, Wise, and Andersen.

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) VI MTh; 215Ex	(3) VII M, VI W; 215Ex
		(2) VI TF; 215Ex	
	Lab.	(1) II-IV T; 210Ex	(4) VII-IX W; 210Ex
		(2) VII-IX Th; 210Ex	(5) VII-IX F; 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

55f—Public Highways. Historical development, administration and legislation pertaining to highways, also general economic problems of highway improvements. 3 cred.; no prereq.; I MWF; 215Ex. Mr. Lang.

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 highway 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., 52; I MWF; 215Ex. Mr. Lang.

HYDRAULIC ENGINEERING

161f—Power. Elementary hydrology; precipitation, evaporation, transportation, runoff, storage and lake levels, types of water power development; dams, waterways, penstock, turbines, and accessory equipment. 4 cred.; prereq., M.&M. 129. Mr. Bass.

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., M.&M. 129. Mr. Bass.

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. 53. 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 Martenis.

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.

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

52s—The Dairy Industry. Composition of milk; milk constituents and their uses in dairy manufacturing and as food; Babcock test; sanitary handling of milk and dairy products on the farm and in the plant; breeds of dairy cattle, housing and management. (Offered in alternate years, spring quarter 1940, etc.

Alternate with Fundamentals of Livestock Production.) 3 cred.; no prereq.; I TThS; 100HH(UF). (For agr. eng. only.) Messrs. Fitch, Combs, and Macy.

DRAWING AND DESCRIPTIVE GEOMETRY

1f,w,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, Williams, Cruzen, Quaid, and von Eschen.

1f (1) VI-VII MTWF; 455C
(2) VI-VII MTWF; 443C
(3) VI-VII MTWF; 445C
(4) VIII-IX MW, VI-VII Th, I-II F; 415C
(5) VIII-IX MW, VI-VII Th, I-II F; 445C
(6) I-II MTThS; 101E
(7) I-II MTThS; 417C
(8) I-II MTThS; 443C
(9) I-II MTThS; 445C
(10) I-II MTThS; 455C

1w (1) VI-VII MTWF; 101E
(2) VIII-IX MWF, VI-VII Th; 455C
(3) I-II MTThS; 445C
(4) I-II MTThS; 417C

2w (1) VI-VII MTWF; 443C
(2) VI-VII MTWF; 445C
(3) VI-VII MTWF; 1E
(4) VIII-IX MWF, VI-VII Th; 443C
(5) VIII-IX MWF, VI-VII Th; 445C
(6) VIII-IX MWF, VI-VII Th; 1E
(7) I-II MTThS; 443C
(8) I-II MTThS; 455C
(9) I-II MTThS; 101E

2s (1) VI-VII MTWF; 415C
(2) VIII-IX MTThF; 415C
(3) VIII-IX MTThF; 417C
(4) I-II MWThF; 415C
(5) I-II MWThS; 201E

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. Messrs. Eggers, Levens, and Shultz.

3f (1) VI-VII MTWTh; 101E
(2) VI-VII MTWTh; 417C
(3) VIII-IX MWF, III-IV S; 201E

3s (1) VI-VII MTWF; 455C
(2) VI-VII MTWF; 445C
(3) VI-VII MTWF; 1E
(4) VIII-IX MTThF; 455C
(5) VIII-IX MTThF; 445C
(6) VIII-IX MTThF; 1E
(7) I-II MWThS; 443C
(8) I-II MWThS; 101E
(9) I-II MWThF; 455C

7f,w,su-8s,su*—Engineering Drawing and Descriptive Geometry. (Chem. and chem. engr.) 3 cred. per qtr.; prereq., solid geometry. Messrs. Myers, Schuck, and Cruzen.

7f (1) III-IV MTWF; 417C
(2) III-IV MTWF; 443C
(3) III-IV MTWF; 445C

7w (1) III-IV MWF, VIII-IX Th; 1E
(2) III-IV MWF, VIII-IX Th; 417C
(3) III MWF, VIII-IX Th; 445C
(4) III MWF, VIII-IX Th; 455C

8s (1) III-IV MTWF; 417C
(2) III-IV MTWF; 101E
(3) III-IV MWFS; 445C
(4) III-IV MWFS; 455C

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; 415C. 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. Messrs. Williams and Shultz.

(1) VI MTWF; 136E
(2) VII MTWF; 227E
(3) I MTThS; 136E
(4) II MThFS; 215E
(5) III MWF, V Th; 206E
(6) III MWF; 215E; V Th; 227E

* For permissible substitute, see page 74.

11f—Engineering Drawing (Mines, Phys.). 2 cred.; prereq., solid geometry; III-IV MWF; 101E. Mr. Potter.

12w—Engineering Drawing (Mines, Phys.). 2 cred.; prereq., 11; III-IV MWF; 101E. Mr. Potter.

13s—Topographic Drawing (Mines). 2 cred.; prereq., 12; III-IV MWF; 415C. Messrs. Levens and Potter.

14w—Descriptive Geometry (Mines). Not an engineering elective. 4 cred.; prereq., 13, M.&M. 13. Messrs. Eggers, Myers, Levens, and Shultz.
Lect. I TThS; 107E
Lab. VII-IX M; 417C

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; 201E
22s I-II MWF; 1E

23f,s,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.
23f I-II MWF; 201E
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, Quaid, and Shultz.
26w (1) VIII-IX MWF; 101E (2) I-II TS, VIII-IX T; 1E
26s VIII-IX MWF; 101E

28f,w,su*—Drafting (Aero.E.). Application of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3. Messrs. Potter, Williams, and Shultz.
28f (1) VIII-IX TWF; 455C (2) III-IV MWF; 455C
28w VI-VII TThF; 415C

29w,s,su—Drafting (Aero.E.). Application of elementary formulas in the proportioning of simple machine parts. Detail and assembly drawings. Machine and structural drafting and graphical methods. 2 cred.; prereq., 28. Messrs. Potter, Williams, and Shultz.
29w III-IV MFS; 415C
29s (1) VI-VII MTW; 101E (2) III-IV TS, I-II Th; 1E

34f,w,s—Lettering. Study and analysis of single stroke lettering with particular emphasis on the application to engineering drawing. 1 cred.; prereq., 1. Messrs. Cruzen and Quaid.
34f (1) IV T; 104E (2) II Th; 7E
34w (1) IV T; 104E (2) II Th; 22E
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,w), 206E(s). Mr. Schuck.

38w,s—Reading Drawings. Calculations and estimates of areas, volumes, and weights, and the tabulation of quantities from working drawings. Problems

* For permissible substitute, see page 74.

concerned with fabrication, manufacture, and construction. 2 cred.; prereq., 2; VI TF; 206E. Mr. Potter.

41f,w,s-42f,w,s-43f,w,s—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.

(1) I-II MWF; 411C
(2) VI-VII MWF; 411C
(3) VIII-IX MWF; 411C

44f,w,s—Lettering. Practical course in plain lettering. Not an engineering or architecture elective. 1 cred.; no prereq. Messrs. Levens and Schuck.

44f	(1) IV T; 21E	(2) II Th; 227E
44w	(1) IV T; 21E	(2) II Th; 205E
44s	(1) IV T; 107E	(2) II Th; 138EE

45f,w,s—Alphabets. Construction and analysis of various types of letters and their arrangement. Exercises and reference work. Not an engineering or architecture elective. 2 cred.; soph., jr., sr.; no prereq. Messrs. Levens and Schuck.

45f	III TTh; 206E
45w	III TTh; 7E
45s	III TTh; 22E

50w,s—Diagrams and Charts. Elementary course dealing with the construction of simple diagrams and charts. 2 cred.; no prereq.; I TTh; 206E(w), 7E(s). 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. Study of graphic reproduction, including engraving and printing, as it relates to present-day advertising, news illustration, and printing. Emphasis is given to technical information on line engravings, halftones, four-color plates, electrotypes, stereotypes, and the relief, offset, and intaglio methods of printing. 3 cred.; jr., sr.; prereq., permission of adviser in School of Business Administration or in Department of Journalism; IV MWF; 206P. 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. 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; ar. Mr. Levens.

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; 206E
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 TThS; 205VH (4) III TThS; 221VH
(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 (9) IV MWF; 105VH
(2) I MWF; 1VH (10) IV MWF; 301VH
(3) I TThS; 210VH (11) V MWF; 221VH
(4) II MWF; 307VH (12) V MWF; 211VH
(5) II TThS; 307VH (13) VI MWF; 210VH
(6) II TThS; 211VH (14) VI MWF; 307VH
(7) III MWF; 113VH (15) VII MWF; 4VH
(8) III MWF; 208P

3s Lect. IV MW; 150Ph
Rec. (1) I MWF; 2VH (4) V MWF; 112VH
(2) III MWF; 211VH (5) VI MWF; 307VH
(3) III TThS; 205VH (6) VII MWF; 205VH

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.

5f Lect. III M; JAud
Rec. (1) I MWThF; 301VH (3) V MTWF; 205VH
(2) IV MTWF; 205VH (4) VI MWThF; 210VH

5w Lect. III M; JAud
Rec. (1) I MWThF; 221VH (3) VI MWThF; 113VH
(2) IV MTWF; 1VH

† Not open to students who have received credit in Econ. 14 or B.A. 70.

5s Lect. III T; BuAud
Rec. (1) I MWThF; 115VH
(2) I MWThF; 211VH
(3) II MWThF; 113VH
(4) II MWThF; 211VH
(5) II MWThF; 221VH
(6) III MWThF; 115VH
(7) III MWThF; 112VH
(8) III MWThF; 113VH
(9) IV MTWF; 6VH
(10) IV MTWF; 113VH
(11) V MTWF; 211VH
(12) V MTWF; 115VH
(13) VI MWThF; 210VH
(14) VI MWThF; 2VH
(15) VI MWThF; 112VH
(16) VII MWThF; 115VH

8f,w-9w,s—General Economics. (Eng., 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.

8f-9w (1) I MWF; 2VH
(2) I MWF; 211VH (fall only)
(3) II MWF; 210VH
(4) III MWF; 211VH
(5) IV MWF; 211VH
8w-9s III TThS; 210VH

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. 3 cred.; no prereq. Mr. Heilman and others.

20f (1) I MWF; 210VH
(2) I MWF; 307VH
(3) I TThS; 307VH
(4) II MWF; 307VH
(5) II MWF; 301VH
(6) II TThS; 301VH
(7) III MWF; 210VH
(8) III TThS; 301VH
(9) IV MWF; 307VH
(10) IV MWF; 301VH
(11) V MWF; 221VH
(12) VI MWF; 221VH
(13) VI MWF; 205VH
(14) VII MWF; 221VH

20w (1) I MWF; 210VH
(2) II MWF; 221VH
(3) III MWF; 205VH
(4) III TThS; 221VH
(5) V MWF; 205VH
(6) VII MWF; 207VH

20s (1) I MWF; 221VH
(2) I TThS; 221VH
(3) II MWF; 210VH
(4) III MWF; 205VH
(5) III TThS; 221VH
(6) IV MWF; 301VH
(7) VI MWF; 221VH
(8) 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.

25f-26w (1) III MWF; 307VH
(2) III TThS; 205VH
(3) V MWF; 307VH
(4) VII MWF; 211VH

25w-26s (1) I MWF; 301VH
(2) I TThS; 301VH
(3) II MWF; 301VH
(4) II TThS; 301VH
(5) III MWF; 301VH
(6) III TThS; 301VH
(7) IV MWF; 307VH (winter only)
(8) VI MWF; 205VH
(9) VII MWF; 307VH (winter only)

25s (1) I MWF; 210VH
(2) II TThS; 210VH
(3) III MWF; 307VH
(4) IV MWF; 307VH

26f (1) II TThS; 307VH
(2) III MWF; 301VH
(3) VII MWF; 307VH

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. (Eng., 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. Messrs. Lund and Nelson.

29f (1) I MWF; 205VH (2) 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 and others.

149f III TThS; 1VH
149w (1) I MWF; 105VH (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. 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) III ThS; 4VH
(2) II ThS; 4VH (5) V Th, IV S; 4VH
(3) II ThS; 105VH(f), 2VH(w,s)

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.

58f IV MWF; 207VH
58w (1) IV MWF; 207VH (2) VI MWF; 207VH
58s (1) IV MWF; 207VH (2) VI MWF; 207VH

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. Mr. Graves.

(1) I MWF; 6VH (2) VII MWF; 6VH

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) IV MWF; 1VH
(2) II MWF; 1VH
71w (1) III TThS; 1VH (2) VI MWF; 1VH
71s (1) III MWF; 1VH (2) III TThS; 6VH

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

* No credit will be given for 51, 52, or 53 until all three are completed.
† Not open to students who have received credit in Econ. 5.
§ Credit may not be received for both Econ. 191-192 and B.A. 58.

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 in 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, and Miss Canoyer.

77f,w,s Lect. I T; 1VH
77f Rec. (1) I ThS; 1VH (3) VII TTh; 1VH
(2) I ThS; 6VH
77w Rec. (1) I ThS; 1VH (3) VII TTh; 1VH
(2) I ThS; 211VH
77s Rec. (1) I ThS; 1VH (2) VII TTh; 1VH

87f,w,s—Report Writing. Lectures on source of data on business conditions and industry, methods of gathering business data. Types, importance, and organization of business reports. Reports written by students are discussed in conference with staff members. 1 cred.; jr., sr.; no prereq, Mr. Heilman.

87f,s VI T; 1VH
87w IV S; 1VH

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; 6VH (3) II MWF; 2VH
(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. Messrs. Boddy and Gaumnitz.

91f VIII-IX F; 2VH
91w IV-V T; 6VH
91s (1) IV-V T; 1VH (2) VIII-IX M; 2VH

101f,w,s-102f,w,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. Mudgett, Stigler, and Boddy.

101f-102w (1) I TThS; 105V (4) III MWF; 105VH
(2) II MWF; 2VH (5) IV MWF; 113VH
(3) II TThS; 207VH (6) VII MWF; 105VH
101w-102s (1) I TThS; 6VH (2) VII MWF; 6VH
101s III TThS; 1VH
102f III TThS; 113VH

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

‡ A fee of $1 per quarter is charged for this course.
§ The entire course must be completed before credit is received for any quarter.

economic phenomena. 3 cred.; jr., sr., grad.; prereq., Econ. 5 or B.A. 70. Mr. Kozelka and others.

112f	(1) I TThS; 207VH	(3) VI MWF; 6VH
	(2) IV MWF; 105VH	
112w	(1) I TThS; 2VH	(3) III TThS; 211VH
	(2) II MWF; 112VH	
112s	(1) II MWF; 6VH	(2) II TThS; 205VH

130f,s—Cost Accounting. (General survey.) 3 cred.; prereq., Econ. 26 or 29. Mr. Ostlund.

130f	I MWF; 105VH
130s	I TThS; 105VH

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	(1) IV MWF; 2VH	(2) VI MWF; 4VH
139w	(1) I MWF; 4VH	(2) VI MWF; 105VH
139s	(1) IV MWF; 4VH	(2) VI MWF; 4VH

142f,w,s—Advanced Money and Banking. 3 cred.; jr., sr., grad.; prereq., Econ. 8, 9. Messrs. Marget, Upgren, and Myers.

142f	(1) II MWF; 6VH	(3) VI MWF; 207VH
	(2) II TThS; 2VH	
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 Upgren.

155f	(1) III MWF; 1VH	(2) VII MWF; 207VH
155w	(1) III MWF; 4VH	(2) VI MWF; 4VH
155s	(1) II TThS; 207VH	(2) VII MWF; 4VH

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; 2VH	(2) III TThS; 6VH
165w	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-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; 301VH(f), 115VH(w), 211VH(s). Mr. Filipetti.

184s§—Scientific Management in Industry. 3 cred.; prereq., 8, 9; VI MWF; 301VH. Mr. Filipetti.

(For other courses see Combined Class Schedule for 1939-40, School of Business Administration section.)

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

§ Credit may not be received for both B.A. 181G and B.A. 184.

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 for 11; reg. in M.&M. 25 for 13. Messrs. Todd and Muckenhirn.

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; 339EE	
15s	Lect.	(1) III TThS; 237EE	(3) I TThS; 339EE
		(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 or reg. in 15. Messrs. Todd and Muckenhirn.

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; 21E
	(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.

(1) I MTWFS; 237EE (2) II MTWFS; 237EE

112f—Junior Electrical Engineering Laboratory. Taken with Course 111. Experiment study of alternating-current circuits and machinery. 2 cred.; prereq., reg. in 111.

(1) VI-IX M; 107EE (3) VI-IX W; 107EE
(2) VI-IX T; 107EE (4) VI-IX Th; 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.

(1) I MWF; 237EE (2) II MWF; 237EE

114w-116s—Junior Electrical Engineering Laboratory. Taken with Courses 113, 115. Experimental study of alternating-current circuits and machinery. 1 cred. per qtr.; prereq., reg. in 113, 115. Lab. given alternate weeks.

(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.

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; 107EE
	(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, 159.

(1) III MWF; 237EE (2) IV MWF; 237EE

122f-124w-126s—Senior Electrical Engineering Laboratory. Operating character-

* 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.

† In courses continuing through three quarters, the work of each quarter is prerequisite for the following quarters.

istics of alternating and direct current machinery. 2 cred. per qtr.; prereq., 116 and reg. in 121, 123, 125.

(1) VI-IX T; 107EE
(2) VI-IX W; 107EE
(3) VI-IX Th; 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, and 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.

DESIGN

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.

137s—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.

197f-198w-199s—Electrical Design. Special problems. 2 cred. per qtr.; prereq., 132, 134, 136. Mr. Kuhlmann.

ELECTRIC POWER

36f-37w-38s—Electric Power. Similar to 43-44-45. 3 cred. per qtr.; sr. M.E.; prereq., Phys. 9 or 43, 44.

36f	Lect.	(1) III MF; 335EE	(2) III MF; 138EE
	Lab.	(1) I-II Th; 107EE	(3) III-IV W; 107EE
		(2) III-IV S; 107EE	(4) VIII-IX Th; 107EE
37w	Lect.	(1) III MF; 335EE	(2) III MF; 138EE
	Lab.	(1) II-III W; 107EE	(3) VIII-IX M; 107EE
		(2) III-IV S; 107EE	(4) VIII-IX W; 107EE
38s	Lect.	(1) II MF; 238EE	(2) II MF; 138EE
	Lab.	(1) II-III W; 107EE	(3) I-II Th; 107EE
		(2) III-IV F; 107EE	(4) III-IV S; 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.; prereq., Phys. 9 or 43; 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. 9 or 43.

Lect. I TTh; 138EE
Lab. VII-IX F; 107EE

42s—Electric Power. Similar to 41. 3 cred.; sr. C.E.; prereq., Phys. 9 or 43, 44; 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 or 43, 44. Mr. Kuhlmann.

	Lect.	(1) III TTh; 335EE	(2) III TTh; 238EE
43f	Lab.	(1) I-II T; 107EE	(3) I-II S; 107EE
		(2) IV-V T; 107EE	(4) VI-VII F; 107EE
44w	Lab.	(1) I-II T; 107EE	(3) I-II F; 107EE
		(2) VIII-IX T; 107EE	(4) VI-VII F; 107EE
45s	Lab.	(1) II-III M; 107EE	(3) I-II F; 107EE
		(2) I-II T; 107EE	

46f-47w-48s—Aeronautical Communication and Electric Power. Fundamentals of direct and alternating current circuits. Elementary principles of radio reception and transmission. Radio beacons, radio navigation, approach systems. 3 cred. per qtr.; prereq., sr. Aero.E., Phys. 9 or 43, 44. Mr. Swanson.

46f	Lect.	VI MWTh; 237EE	
47w	Lect.	VI TTh; 335EE	
	Lab.	(1) II-III M; 227EE	(3) VIII-IX F; 227EE
		(2) II-III Th; 227EE	(4) III-IV F; 227EE
48s	Lect.	VI MF; 335EE	
	Lab.	(1) VI-VII W; 227EE	(3) VIII-IX M; 227EE
		(2) VII-VIII T; 227EE	

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 d.c. transmission. 3 cred.; prereq., reg. in 123; III TThS; 237EE. Mr. Johnson.

143s—Valuation of Public Utility Properties. Factors affecting value, depreciation, taxation, and regulation of public utility properties. Elements of engineering economics; cost analysis, economic investigations, rate making. 3 cred.; sr. and grad. only; III TThS; 339EE. Messrs. Bryant and Johnson.

144w—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.

145s—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 or 43; 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. Melloh.

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.

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. (Not offered in 1939-40.)

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. (Not offered in 1939-40.)

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. (Not offered in 1939-40.)

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 (4) VIII-IX T; 308EE
(2) VIII-IX M; 308EE (5) VI-VII W; 308EE
(3) VI-VII T; 308EE

167f—Radio Transmission. Design and operation of modern transmitting equipment, with special emphasis on broadcast transmission. Registration by permission of instructor. 2 or 3 cred.; II TTh; 339EE. Mr. Webb.

168w-169s—Radio Receiver Design. Detailed study of the problems arising in broadcast receiver design. Registration by permission of instructor. 2 or 3 cred.; II TTh; 339EE. Mr. Webb.

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 1939-40.)

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. Thyratron, 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.

ENGINEERING ENGLISH

4f,w-5w,s-6f,s—Composition. Review of grammar; principles of composition; constant practice in elementary technical exposition. Reading. 3 cred. per qtr.; no prereq. Messrs. Richardson, Becklund, Fitch, Guthrie, Haga, and Lefevre.

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; 21E	(14) I MWF; 5E
	(6) III MTF; 4E	(15) VII MWF; 107E
	(7) III MTF; 135E	(16) VII MWF; 215E
	(8) VIII MWTh; 107E	(17) VII MWF; 206E
	(9) VIII MWTh; 203E	(18) II MThS; 107E
4w	(1) I MWF; 5E	(3) V MWF; 206E
	(2) V MWF; 107E	
5w	(1) IV MWF; 107E	(9) VI MWF; 107E
	(2) IV MWF; 215E	(10) VI MWF; 203E
	(3) IV VMWF; 135E	(11) VI MWF; 215E
	(4) IV MWF; 104E	(12) I MWF; 107E
	(5) III MTF; 4E	(13) I MWF; 135E
	(6) III MTF; 107E	(14) VII MWF; 107E
	(7) III MTF; 203E	(15) VII MWF; 203E
	(8) VI TTh, III S; 107E	(16) VII MWF; 215E
5s	(1) VIII MWF; 107E	(3) V MWF; 107E
	(2) II TThF; 107E	
6f	I MWF; 107E	
6s	(1) III MThF; 107E	(9) IV MWF; 104E
	(2) III MThF; 215E	(10) IV MWF; 135E
	(3) III MThF; 7E	(11) IV MWF; 206E
	(4) II MThF; 5E	(12) I MWF; 107E
	(5) II MThF; 135E	(13) I MWF; 135E
	(6) VI MWF; 215E	(14) VII MWF; 107E
	(7) VI MWF; 107E	(15) VII MWF; 215E
	(8) IV MWF; 107E	(16) III TThS; 107E

7w-8s—Explorations in Literature. An attempt to introduce world literature to the student through a study of books and their authors. 3 cred. per qtr.; credit given for either qtr.; prereq., 6. Mr. Richardson.

7w IV MWF; 22E
8s I MWF; 139EE

36s—The Technical Article. Practice in writing technical articles for both professional and lay readers. 3 cred.; prereq., 6; IV MWF; 227E. Mr. Haga.

37f,w,s—Technical Discussions. (M.E.) Oral presentation of technical and nontechnical 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-12w-13s—Orientation. General lectures by members of the university staff covering the various branches of engineering and allied professions. Illustrated by lantern slides and motion pictures. No cred.; no prereq.; required of freshmen in Engineering and Architecture. 13s is required of freshmen in Chemistry. Mr. Zelner.

11f IX Th; 100C
12w IX Th; 100C
13s IX W; BuAud

70f,w,s—The Slide Rule. Theory, construction, and use. Computation practice. Design of special rules. 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; 22E

81s—Estimating. Plan reading and quantity surveying. Study of costs of concrete, brick, timber, and steel construction. Analysis of material and labor costs. 3 cred.; jr., sr., only. I MWF; 238EE. (Limited to 20 students.) Mr. French.

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

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; 210P	Rec. II F; 210P
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) VIII M; 110P
2f	Lect. III MWF; 208P	Rec. III Th; 208P
2w	Lect. II TThS; 210P	Rec. II F; 210P
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; 220P	(2) VI-VII MW; 220P
Aw	VI-VII WF; 220P	
As	(1) III-IV TS; 220P	(2) VIII-IX WF; 220P
Bf	III-IV TS; 216P	
Bw	(1) I-II MW; 220P	(2) VI-VII TTh; 220P
Bs	VI-VII WF; 220P	

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; 110P	Rec. II S; 110P
1s	Lect. (1) III MWF; 110P (2) VII MWF; 110P	Rec. (1) III Th; 110P (2) VIII M; 110P
3w	Lect. III TThS; 110P	Rec. III F; 110P
3s	Lect. II MWF; 110P	Rec. II S; 110P

Af,w,s‡-Cw,s‡—General Geology Laboratory (General and Economic). 2 cred. per qtr.; no prereq.

Af	(1) III-IV MW; 220P	(2) VI-VII TTh; 220P
Aw	I-II TTh; 216P	
As	(1) III-IV TS; 216P	(2) VIII-IX WF; 220P
Cw	III-IV MW; 220P	
Cs	I-II TTh; 216P	

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. Primarily 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

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

identification. 4 cred. per qtr.; prereq., Inorg. Chem. 10 or equiv. Mr. Gruner.

23f Lect. I TThS; 208P — Rec. IV W; 208P
Lab. (1) III-IV TS; 100P — (2) VI-VII TTh; 100P
24w Lect. I TThS; 208P — Rec. VIII M; 208P
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, VIII Th, VII-VIII F. Mr. Gruner.

85—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.

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; 208P
Lab. VI-VII MW; 105P
92w-93s Lect. I F; 208P
Lab. VI-VII MW; 105P

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; 216P

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; 110P
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 MW; 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.

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; 206P. 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 MWF; 206P. Mr. Hanley.

120s—Glacial Geology. Nature and process of glacial action. Landforms 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; 206P. 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; 206P. Mr. Schwartz.

125s—Structural Geology. A study of the principles and applications of geologic structures. 3 cred.; prereq., 105; II MWF; 208P. 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; 200P
Rec. VI M; 200P
Lab. VI-VII ThF; 200P
132s Lect. III TThS; 200P
Rec. VI M; 200P
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; 206P. 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; 206P. Mr. Hanley.

150—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. Approximately from September 1 to 28. 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 by 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., 105; 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 TThS; 207P
167s VI-VII 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. IV MWF; 113F.

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.

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, recitations, references, and laboratory. 3 cred.; no prereq.; II MWF; 102Hr(UF). Mr. Brierley.

MATHEMATICS AND MECHANICS

MATHEMATICS

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) I MWThFS; 106E
(2) VII MTWThF; 104E
(3) VIII MTWF, III S; 106E
(4) V MTWF, IV S; 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, binominal theorem, progressions, theory of equations, higher numerical equations, partial fractions, and infinite series.

11f (1) II MWThFS; 3E
(2) II MWThFS; 4E
(3) II MWThFS; 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; 205E; III S; 206E
(13) VI MTWThF; 3E
(14) VI MTWThF; 4E
(15) VI MTWThF; 106E
(16) VI MTWThF; 203E
(17) VI MTWThF; 5E
(18) VI MTWThF; 7E
(19) VI MTWThF; 206E
(20) IV MTWFS; 138EE (Arch. only)

11w (1) II MWThFS; 3E
(2) II MWThFS; 104E
(3) I MWThFS; 3E
(4) VIII MWThF, III S; 3E
(5) V MTWThF; 3E
(6) V MTWThF; 4E

12w,s,su—Trigonometry. Graphical representation of functions, computation by logarithms and slide rule. Trigonometric functions, plane right triangles, re-

duction 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.

12w (1) II MWThFS; 4E
(2) II MWThFS; 7E
(3) II MWThFS; 107E
(4) I MWThFS; 4E
(5) I MWThFS; 136E
(6) I MWThFS; 111M
(7) VII MTWThF; 3E
(8) VII MTWThF; 205E
(9) VIII MWThF, III S; 203E
(10) VIII MWThF, III S; 4E
(11) VI MTWThF; 3E
(12) VI MTWThF; 4E
(13) VI MTWThF; 21E
(14) VI MTWThF; 136E

12s (1) II MWThFS; 4E
(2) II MWThFS; 22E
(3) I MTWThF; 4E
(4) VIII MTWThF; 4E
(5) III MWThFS; 3E
(6) V MTWThF; 4E
(7) V MTWThF; 205E

13f,s,su—Analytical Geometry. 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.

13f (1) V MTWThF; 136E
(2) V MTWThF; 215E
(3) I MTWThF; 203E
(4) VIII MTWThF; 104E
(5) III MTWThF; 136E

13s (1) II MWThFS; 3E
(2) II MWThFS; 104E
(3) II MWThFS; 7E
(4) I MTWThF; 3E
(5) I MTWThF; 203E
(6) I MTWThF; 111M
(7) VIII MTWThF; 227E
(8) VIII MTWThF; 136E
(9) VIII MTWThF; 3E
(10) III MWThFS; 206E
(11) III MWThFS; 5E
(12) VI MTWThF; 3E
(13) VI MTWThF; 4E
(14) VI MTWThF; 203E

24f,w,su—Differential Calculus. Limit, derivative, simple applications of derivative, maxima and minima, differentials, rates, change of variables, radius of curvature, mean value, indeterminate forms, partial differentiation, series, 5 cred.; prereq., 13.

24f (1) V MTWThF; 4E
(2) V MTWThF; 3E
(3) IV MTWFS; 106E
(4) IV MWFS; V Th; 21E
(5) II TWThFS; 106E
(6) II TWThFS; 206E
(7) VIII MTWThF; 215E
(8) I MTWThF; 22E
(9) I MTWThF; 3E
(10) VII MTWThF; 106E
(11) III MTWThF; 22E
(12) III MTWThF; 3E
(13) III MTWThF; 104E
(14) III MTWThF; 7E

24w (1) V MTWThF; 203E
(2) V MTWThF; 205E
(3) VII MTWThF; 136E
(4) VI MTWF, IV S; 104E
(5) III MTWThF; 106E
(6) III MTWThF; 22E

25w,s,su—Integral Calculus. Expansion of functions, Taylor's theorem. Standard elementary forms, definite integral, rational fractions, integration by substitution, by parts, reduction formulas, integration a process of summation, successive and partial integration, elementary ordinary differential equations. 5 cred.; prereq., 24.

25w (1) V MTWThF; 215E
(2) V MTWThF; 227E
(3) III MTWThF; 106E
(4) III MTWThF; 215E
(5) III MTWThF; 3E
(6) IV MTWF, II S; 106E
(7) VII MTWThF; 106E
(8) VI MTWF, IV S; 106E
(9) I MTWThF; 205E
(10) I MTWThF; 227E
(11) I MTWThF; 22E

25s (1) VII MTWThF; 106E
(2) II MTWThF; 203E
(3) II MTWThF; 206E
(4) V MTWThF; 215E
(5) III MTWThF; 104E
(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.

151f—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; 215E.

152w-153s—Advanced Calculus with Applications. 3 cred. per qtr.; prereq., 151; I MWF; 215E.

154f-155w-156s—Vector Analysis and Applications. 3 cred. per qtr.; prereq., 26; IV MWF; 139EE(f,w), 138EE(s).

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; 4E(f), 7E(w,s).

254f-255w-256s—Modern Analysis. Based on Whittaker and Watson's text. 3 cred. per qtr.; prereq., 153.

261f-262w-263s—Functions of a Complex Variable. Elliptic functions and integrals with applications. 3 cred. per qtr.; prereq., 153.

For other courses see Combined Class Schedule Bulletin.

MECHANICS

26f,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.

26f (1) II MTWThF; 136E
(2) II MTWThF; 205E
(3) V MTWThF; 106E
(4) V MTWThF; 21E
(5) IV MTWFS; 136E

26s (1) VII MTWThF; 104E
(2) VII MTWThF; 203E
(3) II MTWThF; 106E
(4) II MTWThF; 215E
(5) IV MTWFS; 106E
(6) IV MTWFS; 4E
(7) III MTWThF; 136E
(8) III MTWThF; 215Ex

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.

(1) III MWThFS; 203E
(2) III MWThFS; 4E
(3) I MTThFS; 22E
(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 MWThS; 7E.

127f,w,s—Technical Mechanics: Dynamics. Kinematics of the particle and rigid

* For permissible substitute, see page 74.

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.

127f (1) III MWThFS; 203E (2) I MTWFS; 205E (3) II MTWFS; 203E (4) IV MTWFS; 3E

127w (1) II MTWThF; 203E (2) II MTWThF; 106E (3) III TWThFS; 205E (4) IV MTWFS; 203E

127s (1) IV MTWFS; 136E (2) IV MTWS, V F; 21E (3) I MWThFS; 106E (4) II MTWFS; 205E (5) VI MTWThF; 205E

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.

267f-268w-269s—Advanced Dynamics. Text, Routh's *Rigid Dynamics,* Vol. I. 3 cred. per qtr.; prereq., 153.

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 1939-40.)

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.

85f IV TS, I Th; 206E
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.

87f (1) VIII-IX M; Ex (2) VIII-IX W; Ex
87s VIII-IX M; 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.

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.

128f (1) III MWThFS; 205E (2) II MTWThF; 104E (3) IV MTWFS; 203E

128w (1) IV MTWFS; 3E (2) II MTWThF; 136E (3) II MTWThF; 5E (4) III MTWThF; 136E (5) III MTWThF; 5E (6) VI MTWThF; 205E (7) I TWThFS; 106E (8) IV MTWFS; 315M

128s (1) II MTWFS; 110Ex (2) IV MTWFS; 205E (3) III MWThFS; 205E

141f,w,s—Materials Testing Laboratory. Investigation of the physical properties

* For permissible substitute, see page 74.

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.

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	
141w	Lect.	(1) VII Th; 110Ex	(3) VII W; 110Ex
		(2) VI W; 201Ex	
	Lab.	(1) I-II W; Ex	(6) VIII-IX F; Ex
		(2) VIII-IX M; Ex	(7) VI-VII F; Ex
		(3) I-II S; Ex	(8) II-III M; Ex
		(4) VIII-IX W; Ex	(9) VIII-IX Th; Ex
		(5) II-III Th; Ex	(10) VIII-IX T; 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.

(1) II MF; 21E; VIII-IX Th; 201Ex
(2) II TTh; 21E; VIII-IX M; 201Ex
(3) VI M; 215E; W, 227E; VI-VII F; 201Ex

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 MWF; 110Ex
		(3) III MWF; 5E	
129w	Lect.	(all sections) I Th; HL	
	Rec.	(1) I MTF; 21E	(3) IV MWF; 136E
		(2) I MTF; 203E	
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; I MWF; 110Ex.

132f-133w-134s—Advanced Hydraulic Problems. Special problems in hydraulic design. 2 cred. per qtr.; prereq., 130 or reg. in 130.

* For permissible substitute, see page 74.

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 W; Ex	(6) II-III Th; Ex
	(2) VIII-IX T; Ex	(7) I-II S; Ex
	(3) III-IV M; Ex	(8) VIII-IX W; Ex
	(4) VI-VII W; Ex	(9) VI-VII Th; Ex
	(5) III-IV F; Ex	(10) VIII-IX F; Ex
143w	(1) VI-VII M; Ex	(3) VIII-IX F; Ex
	(2) VIII-IX T; 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; III TThS; 206E.

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., 129 and preferably 130; I TS, VI Th; 136E.

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.

281f-282w-283s—Hydrodynamics. 3 cred. per qtr.; prereq., 129, 153.

284f-285w-286s—Advanced Hydrodynamics. 3 cred. per qtr.; prereq., 283.

MECHANICAL ENGINEERING

WOOD CONSTRUCTION LABORATORY

1f,w,s,su—Elementary Woodworking. Unit bench operations, manipulation and care of hand tools, layout construction of projects, elementary wood turning. 2 to 4 cred.; no prereq.; VI-IX MW. Mr. Richards.

2f,w,s,su—Machine Woodworking. Operation and setting up of woodworking machinery, including care and maintenance of the cutting tools, belts, and various machines. Advanced wood turning. 2 to 4 cred.; prereq., 1; VI-IX MW. Mr. Richards.

3f,w,s,su—Wood Finishing. Methods of preparing wood surfaces for finishes, various types of finishes such as stains, fillers, varnishes, lacquers, paints, and waxes applied by hand or machine methods. Blending of colors and color effects on design. 2 to 4 cred.; no prereq. Mr. Richards.

3f,s Ar
3w II-III MWF

4f,w,s,su—Furniture Construction. Evaluation of the various types of furniture construction, details of design of construction of upholstered and other furniture. Inspection trips to furniture plants. 2 to 4 cred.; prereq., 2. Mr. Richards.

4af,w,s,su—Furniture Construction. Similar to 4 except arranged for School of Architecture. Mr. Richards.

4af,w Ar
4as I-III WF

5f,w,s,su—Pattern Practice and General Woodwork. Study of the principles involved in the construction and use of patterns and core boxes, manipulation and care of hand and machine tools. Inspection trips and reports. 2 cred.; no prereq. Mr. Richards.

5f Ar
5w Ar
5s Lect. V MTh; 202ME
Lab. I-III W

6f,w,s,su—Pattern Practice and General Woodwork. Study of the principles involved in the construction and use of patterns, core boxes, and sweeps. Study of paints, varnishes, stains, and preservatives of wood. Use of machines in producing general wood products. Inspection trips and reports. 2 cred.; prereq., Chem. 5, Draw. 2. Mr. Richards.

6f Lect. (1) II M, III S; 202ME (2) IV WF; 202ME (3) VI T, I S; 202ME
Lab. (1) VI-VIII Th (2) VII-IX F (3) I-III F (4) VII-IX T
6w Lect. (1) VI T, IV S; 202ME (2) II T, VI Th; 202ME (3) I MF; 202ME
Lab. (1) I-III S (2) VII-IX T (3) VII-IX Th (4) VII-IX F
6s Lect. I M, VI T; 202ME
Lab. VII-IX T

7f,w,s,su—Advanced General Woodwork. Problems in mass production of furniture and other things made from wood. 2 cred.; prereq., 6; ar. Messrs. Koepke and Richards.

FOUNDRY LABORATORY

8f,w,s,su—Foundry Practice. Theory and practice in melting and casting ferrous and nonferrous metals. Practice in making cores, bench and floor molds. Problems and reports. 2 cred.; no prereq. Messrs. Holtby and Scobie.

8f Ar
8w Lect. VI T, I F; 153ME
Lab. (1) I-III W (2) II-IV T
8s Lect. V MTh; 153ME
Lab. I-III T

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. 5, Draw. 2. Mr. Holtby.

9f Lect. (1) II F, I S; 153ME (2) VI T, VII W; 153ME (3) I TTh; 153ME
Lab. (1) VI-VIII F (2) II-IV S (3) VII-IX T (4) II-IV W (5) II-IV M (6) VI-VIII Th (7) VII-IX W (8) VI-VIII M
9w Lect. VII M, VI F; 153ME
Lab. VII-IX F
9s Lect. VII T, VIII W; 153ME
Lab. (1) VI-VIII M (2) II-IV S

110f,w,s,su—Advanced Foundry Practice. Foundry control methods, X-ray analysis of castings. Laboratory practice in sand and metal analysis, permanent mold design and operation. Steel and malleable iron castings. Problems and reports. 2 cred.; prereq., 9; Chem. 16; ar. Mr. Holtby.

111f,w,s,su—Advanced Foundry Practice. Continuation of Course 110. 3 cred.; prereq., 10, Phys. 9, Chem. 16; ar. Mr. Holtby.

FORGING, HEAT TREATING, AND WELDING LABORATORY

11f,w,s,su—Forging and Metal Working. Theory and practice of forging, pipe fitting, soldering, brazing, welding, and heat treatment of metals. 2 cred.; no prereq. Mr. Hughes.

11f	Lect.	IV M, IX W; 153ME
	Lab.	II-IV W
11w	Ar	
11s	Lect.	VII Th, I S; 153ME
	Lab.	I-III T

12f,w,s,su—Forging, Heat Treating, and Welding. Forging and heat treatment of metals, operation of furnaces, thermit, electric arc, oxyacetylene, and spot welding. Theory and practice. 2 cred.; prereq., Chem. 5, Draw. 2. Mr. Hughes.

12f	Lect.	(1) VIII W, IX F; 153ME	(2) IX M, VII Th; 153ME
	Lab.	(1) VI-VIII F	(3) II-IV S
		(2) VI-VIII T	(4) II-IV F
12w	Lect.	(1) IV T, II S; 153ME	(3) VI MTh; 153ME
		(2) III TTh; 153ME	
	Lab.	(1) I-III M	(4) I-III F
		(2) VI-VIII W	(5) VII-IX M
		(3) VI-VIII F	(6) VII-IX Th
12s	Lect.	(1) IX M, VIII F; 153ME	(2) VI Th, VII F; 153ME
	Lab.	(1) I-III W	(4) VII-IX T
		(2) VI-VIII M	(5) VI-VIII W
		(3) II-IV S	

13f,w,s,su—Advanced Welding. Course in theory, design, and testing of gas and electric arc welds. 2 to 4 cred.; prereq., 12; ar. Mr. Hughes.

14f,w,s,su—General Metal Work. Course in working various metals, to meet the needs of teachers of elementary forging for art metal courses. Project designed for individual needs. 2 to 4 cred.; no prereq.; ar. Mr. Hughes.

METAL MACHINING LABORATORY

15f,s,su—Machine Shop Practice. Fundamental operation on lathes, shaper, drill press, milling machine, and grinder. Bench work. Job analysis based on unit operations. 2 cred.; no prereq. Not for E.E. Mr. Crowder.

15f	Lect.	VI M, II Th; 202ME	
	Lab.	II-IV S	
15s	Lect.	(1) VII Th, I S; 202ME	(2) VI M, II Th; 202ME
	Lab.	(1) I-III T	(3) I-III F
		(2) VII-IX M	

16s,su—Machine Shop Practice. Fundamental operation on lathes, drill press, milling machine, and grinder. Turret lathe operation and gear cutter. 2 cred.; no prereq. Mr. Crowder.

Lect.	(1) IV T, VI F; 202ME	(3) VI WTh; 202ME
	(2) II MW; 202ME	
Lab.	(1) VII-IX F	(3) VII-IX W
	(2) II-IV S	

17f,w—Machine Shop Practice. (A.E.) Fundamental operations on lathes, shaper, drill press, milling machine, boring machine, and grinder, turret lathe opera-

tion, polishing and buffing, gear cutting and tool grinding, production methods, routing, and machine selection. 3 cred.; prereq., 6, 9, 12. Mr. Crowder.

17f Lect. VII M, VIII Th; 202ME
Lab. (1) II-IV MW (2) I-III T, VII-IX F
17w Lect. VIII T, I W; 153ME
Lab. (1) VII-IX M, I-III F (2) I-III TTh

18w,s—Advanced Machine Shop Practice. Shop practice to suit individual needs. Setting up of turret lathes, production lathes, and milling machines for quantity production. Machinability. Writing of manufacturing operation sheets for complete units. Inspection trips. 3 cred.; prereq., 15, 16, 17, or 71; ar. Mr. Crowder.

19f,w,s—Survey of Manufacturing Laboratory Processes. Technique of machine shop, forge, and foundry. Lectures and demonstrations. 3 cred.; no prereq. Messrs. Hughes, Crowder, and Holtby.

19f I MWF; 153ME
19w,s IV MWF; 153ME

71f,su-72w,su—Machine Shop Practice. Care and operation of machine tools, screw cutting, taper turning, gear cutting, tool grinding, production methods, routing, and machine selection. 2 cred. per qtr.; prereq., 6, 9, 12. Mr. Crowder.

71f Lect. (1) VI WF; 202ME (3) IV T, VIII F; 202ME
(2) VIII M, VI Th; 202ME
Lab. (1) VII-IX W (4) II-IV F
(2) VII-IX T (5) VII-IX Th
(3) I-III Th
72w Lect. (1) VI MW; 202ME (3) VI F, II S; 202ME
(2) II WF; 202ME
Lab. (1) VI-VIII T (4) VII-IX Th
(2) VII-IX F (5) I-III M
(3) VII-IX W

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. Messrs. Palmer and Whitson.

20f (1) VI-VII MTW; 151ME (4) III-IV MFS; 151ME
(2) VIII-IX TF, I-II Th; 151ME (5) I-II WFS; 151ME
(3) VIII-IX MW, VI-VII Th; 151ME
20w I-II TWTh; 255ME

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 Whitson.

21w V-VI MThF; 255ME
21s (1) I-II MF, II-III Th; 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. Martenis.

(1) II TThS; 252ME (4) IV MWS; 252ME
(2) I TThS; 252ME (5) VI MWF; 252ME
(3) III MWF; 252ME (6) III TThS; 252ME

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; 151ME (4) I-III T, VII-IX F; 151ME
(2) VI-VIII T, II-IV S; 255ME (5) I-III M, VII-IX Th; 255ME
(3) VII-IX MF; 255ME (6) VII-IX W, II-IV F; 255ME

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; 255ME (3) VII-IX F; 255ME
(2) II-IV S; 255ME (4) VI-VIII T; 255ME

26w—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. Messrs. Martenis and Palmer.

(1) III WThS; 252ME (4) I MWF; 252ME
(2) IV MWF; 252ME (5) I TThS; 252ME
(3) IV TS, VI Th; 252ME (6) II TTh; 252ME; S, 254ME

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; 254ME (3) I MW; 254ME
(2) II MTh; 254ME (4) IV WF; 254ME
Lab. (1) VII-IX W; 255ME (3) VII-IX Th; 255ME
(2) VII-IX M; 255ME (4) I-III Th; 255ME

28f—Machine Design. (Chem.E.) Kinematic analysis of machine parts. Screw fastenings, riveted and welded joints, piping, shafting, belting, gearing, cams, bearings, pressure vessels, and stresses in machine parts. 3 cred.; prereq., M.&M. 85. Mr. Martenis.

28f VI TTh, VII F; 252ME

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 TTh; 225ME (4) VII-IX M, 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; 251ME
123s VII-IX W, VI-VIII Th; 251ME

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; 254ME. Mr. Ryan.

128f—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, Martenis, and Ryan.

STEAM ENGINEERING

30f—Steam Engineering. (A.E.) Elementary study of the steam power plant, including boilers, stokers, furnaces, fuels, combustion, steam generation, and prime movers. 3 cred.; prereq., Phys. 7 or 23. Messrs. DuPriest and Easton.

(1) II TThS; 154ME
(2) IV MWF; 154ME
(3) III MWF; 154ME
(4) VII MWF; 154ME

31w—Thermodynamics. (A.E.) Heat and mechanical energy and the laws governing the operation of machines used to convert heat energy into mechanical energy. Steam, gas, and oil engines, air compressors, refrigeration machines, and turbines. 3 cred. per qtr.; prereq., 30. Messrs. DuPriest and Easton.

Lect. (1) VI T; 254ME
(2) VIII Th; 254ME
Rec. (1) III TS; 154ME
(2) VI WF; 154ME
(3) IV MW; 154ME
(4) III WF; 154ME
Lab. (1) VIII-IX T; 154ME
(2) VIII-IX F; 154ME
(3) VI-VII M; 154ME
(4) VIII-IX W; 154ME

32f—Elementary Mechanical Laboratory. (A.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 30. Mr. Cobb.

(1) VI-IX F; Ex
(2) VI-IX T; Ex
(3) VI-IX Th; Ex
(4) I-IV S; 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 43. Messrs. Summers and Larsen.

Lect. (1) VI T; 160ME
(2) VI M; 160ME
(3) VI F; 160ME
Lab. (1) VII-IX T; 160ME
(2) II-IV T; 160ME
(3) II-IV S; 160ME
(4) VII-IX M; 160ME
(5) VII-IX W; 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.

Lect. (1) I S; 160ME
(2) VI F; 160ME
(3) VI M; 160ME
Lab. (1) I-III F; 160ME
(2) VII-IX W; 160ME
(3) VI-VIII Th; 160ME
(4) II-IV S; 160ME
(5) VII-IX M; 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. Approximate analysis of fuels. Use of Mahler, Bomb, and Junkers calorimeters. 2 cred.; prereq., 34 and reg. in 132. Messrs. Summers and Larsen.

Lect.	(1) I S; 160ME	(3) VI Th; 160ME
	(2) VI M; 160ME	
Lab.	(1) II-IV 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; calibration and use of instruments; valve setting; operation and testing of steam engines, boilers, compressors, water heaters and purifiers, gas engines, etc. Selection of equipment for power plants. 4 cred.; prereq., Phys. 7 or 23. Mr. Cobb.

Rec.	(1) VI MW, I S; 215Ex	(3) II TThS; 110Ex
	(2) II MWF; 110Ex	
Lab.	(1) VI-VIII F; Ex	(3) VI-VIII Th; Ex
	(2) VII-IX 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. Mr. Cobb.

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. Cobb.

(1) I TThS, VI W; 201Ex	(2) III MWThS; 110Ex

43f—Steam Engineering. (M.E.) An introductory course dealing with power plant equipment and steam generation. 3 cred.; prereq., Chem. 5 and Phys. 7 or 23. Messrs. DuPriest and Easton.

Lect.	(1) VII Th; 254ME	(2) VII T; 254ME
Rec.	(1) I ThS; 154ME	(4) IV TS; 154ME
	(2) II WF; 154ME	(5) III ThS; 154ME
	(3) VI WF; 154ME	(6) I WF; 154ME

131w-132s—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., 9 or 43, M.&M. 25. Messrs. DuPriest and Easton.

131w	Lect.	(1) II T; 254ME	(2) VII M; 254ME
	Rec.	(1) II TS; 154ME	(4) III MTh; 154ME
		(2) I TS; 154ME	(5) II WF; 154ME
		(3) I WF; 154ME	(6) IV TS; 154ME
	Lab.	(1) VIII-IX M; 154ME	(4) I-II Th; 154ME
		(2) VIII-IX Th; 151ME	(5) VI-VII T; 154ME
		(3) I-II M; 154ME	(6) VI-VII Th; 151ME

132s	Lect.	(1) VI F; 254ME	(2) VII F; 254ME
	Rec.	(1) III MW; 154ME	(4) III TTh; 154ME
		(2) II TTh; 154ME	(5) IV TS; 154ME
		(3) I TS; 154ME	
	Lab.	(1) VI-VII T; 154ME	(4) VI-VII Th; 154ME
		(2) VI-VII W; 154ME	(5) VIII-IX F; 154ME
		(3) VIII-IX M; 154ME	

138w—General Laboratory. 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. 2 cred.; prereq., Min.E. 122; VI-IX Th; Ex. Mr. Shoop.

141f,w—Power Plant Engineering. Theory, practice, and economics relating to prime movers and steam generating equipment of the modern power plant, including auxiliary units such as condensers, heaters, purifiers, pumps, fans, piping, etc. 3 cred.; prereq., 132. Mr. Shoop.

141f	(1) II MWF; 252ME	(2) I MWF; 252ME
141w	(1) I MWF; 110Ex	(2) II MWF; 201Ex

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., 141; I MWF; 215Ex. Mr. Shoop.

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., 141 or reg. in 141; VII-IX MW; 151ME. 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, 141 or reg. in 141. Mr. Shoop.

149f,w	(1) I-IV T; Ex	(2) VI-IX T; Ex
149s	(1) I-IV T; Ex	(2) VI-IX F; Ex

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; 201Ex	(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., 31 or 131. Mr. Robertson.

150f	(1) II MWF; 254ME	(3) I MWF; 254ME
	(2) III TThS; 254ME	(4) II TThS; 254ME
150w	(1) II MFS; 252ME	(2) I MWF; 254ME

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. Lectures and assigned readings. 3 cred.; prereq., 150. Mr. Robertson.

153w,s—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. Messrs. Robertson and Ford.

153w	IV MTF; 215Ex
153s	I MWF; 201Ex

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 VII-VIII M, VI-IX F; OSL
158s (1) VI-IX T, I-II S; OSL (3) VI-IX Th, VIII-IX W; OSL
(2) VI-IX W, VII-VIII F; 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. Grad. only. Cred. ar. 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, central station heating. 3 cred.; prereq., 131, M.&M. 127, 129. Messrs. Rowley and Jordan.

Lect. (1) III W; 201Ex (2) VI M; 201Ex
Rec. (1) II ThS; 201Ex or III ThS; 201Ex (2) IV TS; 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, ventilating, 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; 251ME
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; 215Ex. Messrs. Rowley and Jordan.

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. Mr. Rowley.

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; 201Ex. 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; 227E. Mr. Rowley.

169f,w,s—Heating and Ventilation Laboratory. Tests of heating, ventilating, 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 (3) VI-IX W; Ex
(2) VI-IX T; Ex
169w (1) I-IV T; Ex (2) VI-IX F; Ex
169s 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. Mr. Martenis.

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.

73s—Nonmetal Manufacturing. Methods and processes of manufacturing goods from materials such as wood, wood and metal substitutes, asbestos, hard rubber, bakelite, and other synthetic substances. 3 cred.; prereq., 18, 20; 2 lect.; 6 hr. of lab. Messrs. Koepke and Richards.

74s—Safety Engineering. Safety of the worker; 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., 17. 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., 17. 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., 17, 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., 17, 171. Mr. Crowder.

Lect. I TTh; 202ME
Lab. VI-VIII T

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., 17. Mr. Koepke.

171f IV MWF; 205ME
171w I MWF; 205ME

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. I TS, I-III Th; 205ME. Mr. Koepke.

173s—Industrial Organization. Problems involved in organizing and controlling factory organizations. 3 cred.; 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., 17, 171, or B.A. 89, or reg. in 171. Mr. Whitson.

174f	Lect. III W; 205ME	
	Lab. (1) VII-IX T; 205ME	(2) VI-VIII F; 205ME
174w	Lect. III W; 205ME	
	Lab. (1) II-IV T; 205ME	(2) VI-VIII T; 205ME
174s	Lect. III F; 205ME	
	Lab. (1) II-IV T; 205ME	(2) VI-VIII Th; 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. II MWF; 205ME. Mr. Whitson.

179s—Industrial Relations. The relations of a personnel department to industrial engineering. Foreman training, job analysis, service departments. Lect. and lab. 3 cred.; prereq., 172 and reg. in 173. Mr. Whitson.

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

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. Mr. DuPriest.

190f	(1) VI Th; 154ME	(3) II M; 154ME
	(2) VI M; 154ME	(4) VI T; 154ME
191w	(1) VI Th; 154ME	(3) VII W; 154ME
	(2) VII Th; 154ME	(4) IV F; 154ME
192s	(1) II S; 154ME	(3) IV F; 154ME
	(2) IV W; 154ME	(4) II W; 154ME

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; III MFS; 252ME. Mr. DuPriest.

194w,s—Advanced Engineering Problems. Opportunity will be offered for carrying on special investigations in the various fields of mechanical engineering. 2 cred.; registration by permission of the division chief in charge of work. Open only to sr. M.E.

195s—Inspection Trip. During the latter part 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. DuPriest.

281f—Railway Technology. Systematic course of visits to the various railroad shops in the vicinity to study locomotive details and classifications. Locomotive practice. 1 cred.; prereq., M.&M. 127, 128, 129. Mr. Martenis.

282f-283w-284s—Locomotive Design and Construction. Locomotive details. Design of boiler, cylinders, frame, springs, trucks, axles, wheels, running gear, equalizing arrangements, valve gears, lubrication. Lectures, assigned reading, and drafting. 3 cred. per qtr.; prereq., 281. Mr. Martenis.

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. Messrs. DuPriest, Koepke, Rowley, Shoop, Martenis, Robertson, and Summers.

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. Griswold.

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., miners, geologists, and petroleum engineers 1 cred.; prereq., reg. in Met. 1. Messrs. Pease and Griswold.

VI-IX WF; 7M (for metallurgists)
VI-IX W or VI-IX F; 7M (for miners, geologists, and petroleum engineers)

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 nonferrous metals. Lectures and recitations. 2 cred.; prereq., 11; 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., 12; 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 F; 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., 112. Mr. Davis.
Lect. VI F; MEx
Lab. VII-IX F; MEx

122w—Ore Testing. Determination of methods for metallurgical and economic extraction of non-ferrous 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 hr. 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. VII-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-IX 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

139—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, lectures, 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

171—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 MW; 304M
Lab. VI-VIII 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; 109M
Lab. (1) VII-IX M; 17M (2) VII-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 speci-

fications. Outside reading and special reports. Laboratory work. 3 cred.; prereq., 156. Mr. Dowdell.
Lect. IV MW; 305M
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) VII-IX 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. 2 or 3 cred. depending on lab.; prereq., 160. Mr. Jerabek.
Lect. I MF; 306M
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., 160. Mr. Jerabek.
Lect. III MF; 306M
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

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; 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. Captain Zimmer.

1f (1) III MWF; A (3) VIII MWTh; A
(2) VI MWF; A
2w (1) III MWF; A (3) IX MWF; A
(2) VI MWF; A
3s I M, I T or VII T, V and 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. Captain Maddocks.

1f (1) III MWF; A (3) VIII MWTh; A
(2) VI MWF; A
2w III, VI or IX MWF, A and V or VI MWF, 321EE†
3s I M, I T, or VII T; V and IX T; A

† A total of three hours per week.

4f-5w-6s—Second Year Basic Course, R.O.T.C.

Coast Artillery. Duties of non-commissioned officer of Coast Artillery; motor transportation; aircraft identification and characteristics; position finding and fire control for anti-aircraft artillery. 1 cred. per qtr.; prereq., 1-2-3, M.&M., 11, 12 or equiv. Captain Zimmer.

4f	(1) II TThS; A (2) IV MWF; A	(3) VIII MWTh; A
5w	(1) II TThS; A (2) IV MWF; A	(3) IX MWF; A
6s	(1) I M, V, IX T; A	(2) I, 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 nets; signal communication for all arms; leadership. 1 cred. per qtr.; prereq., 1-2-3. Captain Maddocks.

4f-5w III MWF; 321EE
6s I M, I T, or VII T; V and 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. Major Berry.

151f-152w	(1) II MWF, VI-VII M or W; A (2) IV MWF, VI-VII M or W; A	(3) VI MWF, VII MW; A
153s	(1) II MWF, V, IX T; A (2) IV MWF, V, IX T; A	(3) VI 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. Captain Maddocks.

151f-152w IV MWF, III T; 321EE
153s V, VII-IX T; A

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; tactics; artillery tactics. 3 cred. per qtr.; prereq., 151-152-153. Lieut. Col. French.

154f	(1) I MWF, VIII-IX W or F; A (2) IV MWF, VIII-IX W or F; A	(3) VI MWF, VIII-IX W or F; A
155w	(1) IV MWF, VIII-IX W or F; A (2) III MWF, VIII-IX W or F; A	(3) IV TTh, II S, VIII-IX W or F; A
156s	(1) I MWF, V, IX T; A (2) IV MWF, V, IX T; A	(3) VI 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. Captain Maddocks.

154f (1) I MWF; A; VI T; 321EE (3) VI MWF; A; VI T; 321EE
(2) IV MWF; A; VI T; 321EE
155w VII MWF, IV T; 321EE
156s IV, VI IX T; A

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, earthworth 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, 13. Messrs. Lambert, Heilig, and Griswold.

11f Lect. III MWF; 315M
Quiz IV M; 315M
12w Lect. III MWF; 315M
Quiz II S; 315M
13s Lect. III MW; 315M
Quiz III F; 315M

14f—Field Work. General work in plane surveying and adjustment of instruments. 5 cred.; prereq., 11, 12; VI-IX MTWThF. Messrs. Lambert, Heilig, and Griswold.

15—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., soph. year; 4 weeks beginning about June 15. Messrs. Lambert, Heilig, and Griswold.

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 field trip. 1 cred.; prereq., 15; VI-VIII T; 205M. Mr. Lambert.

111f—Exploration. Prospecting, boring, drill steel, drill bits. 3 cred.; prereq., Geol. 105; I MWFS; 202M. Mr. Heilig.

112w—Exploration and Development. Explosives and blasting; timbering and timber treating; tunneling and drifting. 3 cred.; prereq., 111; I MWF, II S; 202M. Mr. Heilig.

113s—Development and Exploitation. Shaft sinking, raising, stoping, mining methods; support of excavations. 3 cred.; prereq., 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 receive 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. Elec-

tricity applied to mining. 3 cred. per qtr.; prereq., M.&M. 33, Phys. 9. Mr. Comstock.

121f II MTWFS; 202M
122w-123s II MTWThF; 202M

125f—Mining and Metallurgical Hydraulics. Application of hydraulic principles of 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.; prereq., M.&M. 127; III MTWThS; 111M. Mr. Heilig.

126f—Engineering Construction. Theory of structures, loading, analytic and graphic resolution of stresses in frame structures, stresses in ore bins, head frames, etc. 3 cred.; prereq., 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.; prereq., 126; II-III M, VII-IX Th, II-IV 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.; prereq., 112; 202M. Mr. Parker.

139—Practical Mining (Field Trip). Study of mining operations, mine plant, and mining in one or more mining camps. 6 cred.; prereq., jr. year. Three weeks beginning about September 1. Mr. Parker.

141f—Reports and Administration. Examinations and reports; valuation and amortization; depletion and depreciation; taxation; corporations; capitalization; stocks and bonds; contracts and specifications. 3 cred.; prereq., 113; 202M. Mr. Parker.

142w—Coal Mining. Coal mining methods; mechanization; tipple arrangements and coal preparation; mine gases; safety lamps and tests; safety work and organization; labor organizations and agreements. 3 cred.; prereq., 141; IV MTWF; 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 hr. ar.; prereq., reg. in Min.E. 141-142-143. Mr. Parker.

PETROLEUM ENGINEERING

111f—Oil Field Development. Occurrence of petroelum. Petroleum exploration methods. Drilling equipment and drilling methods. Drilling fluids and circulating systems. Casing and casing methods. Shutting off water. Cement and cementing methods. Crooked holes and directional drilling. Survey of wells. Mechanical and electrical coring. Drilling records, logs, and maps. 3 cred.; prereq., Geol. 105; I MWFS; 112M. Mr. Lacabanne.

112w—Oil Field Production. Principles governing drainage and flow of oil in porous formations. Completing and equipping wells for production. Oil production methods and equipment. Flowing wells and their control. Maintenance and repair of wells. Secondary method of oil recovery. Decline characteristics of wells. Water problems of flowing wells. Storage of petroleum. Oil gaging and sampling. Production of natural gas. 3 cred.; prereq.; Pet.E. 111; I MWFS; 112M. Mr. Lacabanne.

131s—Petroleum Refining. Distillation and purification processes used in making commercial products from crude petroleum. 2 cred.; prereq., Inorg. Chem. 16, Phys. 7 or 23; 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.

135—Field Work. Study of equipment and operations in one or more oil fields. 6 cred.; prereq., jr. year. Three weeks beginning about September 1.

138s—Oil Field Mapping. Oil and gas well logs, property, contour, and subsurface maps. Cross section and correlation maps, oil well survey plates. Methods of displaying data and records, graphical, stereograms, peg models. 2 cred.; prereq., Min. 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., Pet.E. 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., Pet.E. 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 F; 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 Pet.E. 141 or Pet.E. 144-145. Messrs. Parker and Lacabanne.

NAVAL SCIENCE AND TACTICS

See special bulletin for announcement of courses.

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.

SPORTS EDUCATION

Supervisor of Sports Education: Mr. Piper.

1f,2w,3s†—Sports Education.

Survey Course	III MWF	
	IV MWF	
Fall: Touchball, Swimming, Volleyball		
Winter: Boxing, Wrestling, Basketball, Golf		
Spring: Soft Ball, Tennis, Handball, Squash Racquets		
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 winter only
	IX MWF	Fall and 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)

Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

† Three credits are given when three quarters are completed.

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. Nier.

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., M.&M. 12.

7f Lect. (1) III MTWF; 150Ph
(2) II MWThF; 150Ph
(3) VI MWThF; 150Ph
Quiz* (1) IX Th; 150Ph
(2) IX M; 150Ph
(3) IX T or Th; 150Ph
Lab. (1) I-II M; ar
(2) III-IV M; ar
(3) VI-VII M; ar
(4) VIII-IX M; ar
(5) I-II T; ar
(6) III-IV T; ar
(7) VI-VII T; ar (Chem., Chem.E. only)
(8) VIII-IX T; ar
(9) I-II W; ar
(10) III-IV W; ar
(11) VI-VII W; ar
(12) VI-VII Th; ar (Chem., Chem.E. only)
(13) VIII-IX Th; ar (Chem., Chem.E. only)
(14) I-II F; ar
(15) VI-VII F; ar
(16) I-II S; ar
(17) III-IV S; ar (Chem., Chem.E. only)

7w Lect. II MWThF; 166Ph
Quiz II S; 150Ph
Lab. (1) VI-VII M; ar
(2) VI-VII W; ar
(3) VI-VII F; ar
(4) VIII-IX Th; ar
(5) III-IV S; ar

8w Lect. (1) III MWFS; 150Ph
(2) II MWThF; 150Ph
(3) VI MWThF; 150Ph
Quiz* (1) IX T; 150Ph
(2) VII T; 150Ph or IX M; 150Ph
(3) IX Th; 150Ph
Lab. (1) I-II M; ar
(2) III-IV M; ar
(3) VI-VII M; ar
(4) VIII-IX M; ar
(5) I-II T; ar
(6) III-IV T; ar
(7) VI-VII T; ar
(8) VIII-IX T; ar (Chem., Chem.E. only)
(9) I-II W; ar (Chem., Chem.E. only)
(10) III-IV W; ar
(11) VI-VII W; ar
(12) VI-VII Th; ar (Chem., Chem.E. only)
(13) VIII-IX Th; ar (Chem., Chem.E. only)
(14) I-II F; ar
(15) VI-VII F; ar
(16) I-II S; ar
(17) III-IV S; ar

8s Lect. II MWThF; 166Ph
Quiz VIII T; 150Ph
Lab. (1) VI-VII M; ar
(2) VI-VII W; ar
(3) VI-VII F; ar
(4) VIII-IX Th; ar
(5) III-IV S; ar

* The quiz section must correspond to the lecture section.

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

9f Lect. II MWThF; 166Ph
Quiz II S; 150Ph
Lab. (1) VI-VII M; ar
(2) VI-VII W; ar
(3) VI-VII F; ar
(4) VIII-IX Th; ar
(5) III-IV S; ar

9s Lect. (1) III MTWF; 150Ph
(2) II MWThF; 150Ph
(3) VI MWThF; 150Ph
Quiz* (1) III Th; 150Ph
(2) II S or VIII Th; 150Ph.
(3) VI T; 150Ph
Lab. (1) I-II M; ar
(2) III-IV M; ar
(3) VI-VII M; ar
(4) VIII-IX M; ar
(5) I-II T; ar
(6) III-IV T; ar
(7) VI-VII T; ar (Chem., Chem.E. only)
(8) VIII-IX T; ar (Chem., Chem.E. only)
(9) I-II W; ar (Chem., Chem.E. only)
(10) VI-VII W; ar (Chem., Chem.E. only)
(11) VI-VII Th; ar
(12) VIII-IX Th; ar
(13) I-II F; ar
(14) VI-VII F; ar
(15) I-II S; ar
(16) III-IV S; ar

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. Mr. Haliday.

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.

71f-73w-75s—Intermediate Physics. 4 cred. per qtr.; all; prereq., Calculus and 12 cred. in phys.; II TThFS; 342Ph. Mr. Bardeen.

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. Mr. Nier.

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 labora-

* The quiz section must correspond to the lecture section.
‡ A fee of $2 is charged for this course.
§ Students may enter any quarter.

tory. 3 cred.; prereq., 15 cred. in phys.; VII-IX MW, or ar.; 241Ph. Mr. Miller.

131w—Geometrical and Physical Optics. 3 cred.; prereq., 15 cred. in phys.; ar.; 342Ph. (Not offered in 1939-40.)

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.

137s—Electrical Properties of Crystals. 3 cred.; jr., sr., grad.; prereq., 12 cred. in phys., M.&M. 25; ar. (Not offered in 1939-40.)

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. III S; 133Ph
Quiz II Th; 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. 3 cred.; prereq., 144 and permission of instructor; ar.; 232Ph. Mr. Rumbaugh.

152f—X-Rays. Study of the nature and production of X-rays. 3 cred.; prereq., 43; I TThS; 133Ph. (Not offered in 1939-40.)

154w‡—X-Ray Spectroscopy. 3 cred.; prereq., 44, 152, M.&M. 25 and permission of instructor; ar. (Not offered in 1939-40.)

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.

PHYSIOLOGICAL CHEMISTRY

100f,su—Physiological Chemistry. Application of physical and organic chemistry to physiology. 7 cred.; prereq., phys. and org. chem. Messrs. McClendon, Armstrong, Hemingway, Samuels, and Arnow.

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

101w,su—Physiological Chemistry. Hormones, vitamins, digestion, and mineral metabolism. 6 cred.; prereq., Physiol. 100. Messrs. McClendon, Armstrong, Hemingway, Samuels, and Arnow.

Lect. IV TS, VI F; MeS Aud
Quiz VI T
Lab. (1) I-III MW; 310MH (3) I-III ThS; 310MH
(2) I-III MW; 310MH (4) I-III ThS; 310MH

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 pro-

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

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

cedure 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) I MWF; 206Pt (2) IV MWF; Bu Aud

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. Routledge and Nichols.

22f (1) I MWF; 311En(UF) (4) II TThS; 311En(UF)
(2) I TThS; 310En(UF) (5) III MWF; 311En(UF)
(3) II MWF; 310En(UF) (6) IV MWF; 311En(UF)

22w (1) I MWF; 311En(UF) (5) III MWF; 311En(UF)
(2) I TThS; 307En(UF) (6) III TThS; 311En(UF)
(3) II MWF; 311HH(UF) (7) IV MWF; 311En(UF)
(4) II TThS; 311En(UF)

22s (1) II TThS; 307En(UF) (3) III TThS; 307En(UF)
(2) III MWF; 311En(UF)

23s—Public Speaking. 5 cred.; prereq., Engl. 6; IV MTWFS; 311En(UF). Mr. Routledge.

SOILS

6w—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. 5 cred.; no prereq.; II MTWThF; 204So(UF). Mr. Rost.

108w—Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. 3 cred.; jr., sr.; prereq., 6. 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, Wodsedalek, Dawson, and Olson.

Lect. (1) II TTh; 06Bo (Limit 320) (3) III WF; 06Bo (Limit 320)
(2) IV TS; 06Bo (Limit 320) (4) IV WF; 06Bo (Limit 240)

Lab. (1) I-II MF; 101Z (Limit 150) (5) I-II TS; 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) V-VI 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.

INDEX