

*The Bulletin*  
*of the University of*  
**Minnesota**

*The Graduate School*  
*Announcement for the Years*  
**1929-1931**



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1929							1930													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	1	2	3	4	5	6	..	..	..	1	2	3	4	..	..	1	2	3	4	5
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26
28	29	30	31	..	..	..	26	27	28	29	30	31	..	27	28	29	30	31	..	..
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<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
..	..	..	..	1	2	3	..	..	..	..	..	..	1	..	..	..	..	..	1	2
4	5	6	7	8	9	10	2	3	4	5	6	7	8	3	4	5	6	7	8	9
11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16
18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23
25	26	27	28	29	30	31	23	24	25	26	27	28	..	24	25	26	27	28	29	30
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<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
1	2	3	4	5	6	7	..	..	..	..	..	..	1	..	1	2	3	4	5	6
8	9	10	11	12	13	14	2	3	4	5	6	7	8	7	8	9	10	11	12	13
15	16	17	18	19	20	21	9	10	11	12	13	14	15	14	15	16	17	18	19	20
22	23	24	25	26	27	28	16	17	18	19	20	21	22	21	22	23	24	25	26	27
29	30	..	..	..	..	..	23	24	25	26	27	28	29	28	29	30	..	..	..	..
..	..	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
<b>OCTOBER</b>							<b>APRIL</b>							<b>OCTOBER</b>						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
..	..	..	..	..	1	2	..	..	..	..	1	2	3	..	..	..	..	..	..	1
3	4	5	6	7	8	9	4	5	6	7	8	9	10	2	3	4	5	6	7	8
10	11	12	13	14	15	16	11	12	13	14	15	16	17	9	10	11	12	13	14	15
17	18	19	20	21	22	23	18	19	20	21	22	23	24	16	17	18	19	20	21	22
24	25	26	27	28	29	30	25	26	27	28	29	30	31	23	24	25	26	27	28	29
..	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
1	2	3	4	5	6	7	1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	31	..	..	..	..	29	30	..	..	..	..	..	28	29	30	31	..	..	..
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# UNIVERSITY CALENDAR

1929-30

1929			
September 23-Oct. 12			Registration of graduate students
September 30	Monday		Fall quarter begins, 8:30* a.m.
October 10	Thursday		Examinations in German and French for candidates for advanced degrees
November 7	Thursday		Last day for filing theses of candidates for the fall quarter
November 5	Saturday		Last day for filing subject-matter of Master's thesis for the spring quarter
December 9	Thursday		Commencement Convocation
December 21	Saturday		Fall quarter ends, Christmas vacation begins, 5:20 p.m.
1930			
January 6	Monday		Christmas vacation ends, winter quarter begins, 8:30* a.m.
January 9	Thursday		Examinations in German and French for candidates for all advanced degrees
February 8	Saturday		Last day for filing theses of candidates for the winter quarter
March 20	Thursday		Commencement Convocation
March 22	Saturday		Winter quarter ends, spring vacation begins, 5:20 p.m.
March 31	Monday		Spring vacation ends, spring quarter begins, 8:30* a.m.
April 10	Thursday		Examinations in German and French for candidates for all advanced degrees
April 28	Monday		Last day for filing theses of candidates for all advanced degrees
June 14	Saturday		Spring quarter closes
June 9	Monday		Fifty-eighth annual commencement
June 19	Thursday		Summer Session, first term begins
July 5	Saturday		Last day for filing theses of candidates at summer convocation
July 26	Saturday		First term, Summer Session closes
July 28	Monday		Summer Session, second term begins
August 30	Saturday		Second term, Summer Session closes

\* First hour classes begin at 8:15 at University Farm.

## THE GRADUATE SCHOOL ORGANIZATION

The Graduate School has exclusive control of all graduate work carried on in the University. The graduate faculty is composed of those properly approved and qualified to offer courses carrying graduate credit. It determines the general educational policy of the Graduate School, and recommends candidates for degrees. The administration of the Graduate School is committed to the dean and an executive committee of seven members. They are assisted by group committees representing allied lines of work grouped together for administrative purposes. The groups are as follow:

- a. Social Sciences and Law
- b. Physical Sciences, Mathematics, and Engineering
- c. Biological Sciences.
- d. Philosophy, Psychology, and Education
- e. Language and Literature
- f. Medicine
- g. Agriculture

### ADMISSION

Any graduate holding a Bachelor's degree or its equivalent from a reputable college or university will be admitted to the Graduate School without examination, and may register for such graduate work as he may be found prepared to enter upon, but he will not thereby be admitted to candidacy for any of the higher degrees until his case has been duly considered and approved.

All inquiries concerning admission to the Graduate School should be addressed to the dean. The student is advised to obtain and fill out an application for admission before presenting himself for registration.

If the rating of the institution from which he received his first degree is such that he will need a year or more of additional work before beginning graduate work at the University of Minnesota, he is advised to enter one of the undergraduate colleges of the University and obtain the preliminary training and an acceptable Bachelor's degree.

College graduates who simply desire to take additional work of undergraduate grade without a view to preparation for an advanced degree should register as unclassified students in the college giving the work.

Advanced standing may be granted for work done in other approved graduate schools. Credits for advanced courses earned while the student is registered in an undergraduate college, even if in excess of the credits required for the baccalaureate degree, cannot be transferred to the Graduate School. In exceptional cases, with permission of the dean of the undergraduate college concerned and of the dean of the Graduate School, undergraduates lacking not more than 9 quarter credits may be permitted to register also in the Graduate School for partial credit.



## REGISTRATION

Full directions concerning registration will be found in a booklet issued by the registrar's office for the information of new students. The essential document is an official transcript of the student's college record.

## FEES

	Quarter
Tuition fee for residents (except for clinical medicine).....	\$20.00
Tuition fee for non-residents.....	30.00
Credit hour tuition for students carrying less than full work	
Residents .....	1.75
Non-residents .....	2.50
Deposit (first quarter in residence).....	3.00
Special deposit for Chemistry laboratory.....	5.00

Voted to approve effective, beginning with the academic year 1929-30, a fee of \$60 plus the established graduation fee for the professional degrees in engineering, architecture, and chemistry for work done in absentia.

Registration in the Graduate School includes the making out of the program and paying fees for the entire year (or the balance of the year when registration occurs after the fall quarter).

Fees must be paid not later than one week following the approval of the registration by the dean of the Graduate School in order to avoid a \$2 penalty fee.

All the fees above mentioned apply to the regular session. For the summer quarter fees, see special bulletin.

## FELLOWSHIPS AND SCHOLARSHIPS

Four graduate fellowships have been established by the late Thomas H. Shevlin, of Minneapolis. These are awarded one each in the College of Agriculture, Forestry, and Home Economics, the School of Chemistry, the Medical School, and the College of Science, Literature, and the Arts. Each fellowship yields \$500 per annum. They are awarded annually. Candidates for these fellowships should file their applications before March 1 with the dean of the Graduate School.

Shevlin fellows will devote their entire time to the graduate work for which they are registered, and may not engage in private tutoring or be required to render any service to the University.

CALEB DORR RESEARCH FELLOWSHIPS IN AGRICULTURE, FORESTRY,  
AND HOME ECONOMICS

By the request of the late Caleb Dorr, of Minneapolis, the income from twenty thousand dollars is available for graduate fellowships in the Department of Agriculture of the University of Minnesota. Usually three fellowships of \$500 each will be awarded each year. The holders of these fellowships are exempt from all tuition fees. The basis of the award is scholarship and the prospect and promise of productive research.

Caleb Dorr fellows will devote their entire time during the academic year (nine months) to the graduate work for which they are registered and may not engage in private tutoring or be required to render any service to the University.

Candidates for these fellowships should file their applications before March 1 with the dean of the Graduate School. Application blanks may be secured from the dean of the Graduate School or from the dean of the College of Agriculture, Forestry, and Home Economics.

#### THE DUPONT FELLOWSHIP IN CHEMISTRY

This fellowship, established by E. I. duPont de Nemours and Company, yields \$750 annually. The holder devotes his entire time to graduate study and is not required to render any service to the University.

#### THE ALBERT HOWARD SCHOLARSHIP

This scholarship, founded by Mr. James T. Howard, yields \$240 annually. The holder is expected to do graduate work in liberal arts.

#### THE CLASS OF 1890 FELLOWSHIP

On the twenty-fifth anniversary of its graduation the class of 1890 founded a fellowship yielding \$200 and exemption from tuition. This fellowship is open to graduates of the Colleges of Science, Literature, and the Arts, and Engineering and Architecture desiring to pursue advanced work. Applications should be filed with the dean of the Graduate School before March 1.

#### HONORARY FELLOWSHIPS FOR VISITING SCHOLARS

Professors or other eminent scholars from other institutions, who may desire temporarily the privileges of the library, research facilities, and seminars in the University, and who are not candidates for a degree, may upon recommendation of the dean of the Graduate School and the approval of the president of the University be appointed as honorary fellows without stipend.

Honorary fellows shall not be required to pay any fees except to cover the cost of unusually expensive supplies or equipment.

#### DEPARTMENTAL SCHOLARSHIPS

Besides the above stipends there are about seventy scholarships assigned to various departments, yielding \$225 and exemption from tuition and fees. The holders may be required to render service not to exceed ten hours a week in laboratory or office work, or not more than three hours in classroom assistance. Where these regulations are observed, a qualified holder of one of these scholarships may become a candidate for the Master's degree on the basis of one year's work in residence.

Other assistantships and teaching fellowships, some yielding as high as \$1,000 are available, but the amount of work required is greater and the length of residence of the holder of one of these appointments would be increased proportionately.

Inquiries and requests for application blanks may be addressed to the dean of the Graduate School, or to the head of the department in question.

### GRADUATE WORK IN THE SUMMER QUARTER

Work of graduate character done in the summer quarter of the University of Minnesota may be counted for residence credit for advanced degrees. In exceptional cases, the course work for the Master's degree may be completed in four summer terms of six weeks each, or in three full summer quarters. In the first case, the candidate may 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 quarter students must be completed at least four weeks before the end of the session in which they take the degree.

An increasing amount of graduate work in fields of interest to high school teachers is being offered in the summer quarter. The courses for any session may be found in the bulletin of the summer quarter.

Students who desire graduate credit for work in the summer must register through the office of the Graduate School.

### GRADUATE WORK IN MEDICINE

Graduate work in the laboratory departments and in the clinical branches leading to advanced degrees is offered by the University of Minnesota. This work is under the direction of the Graduate School, and candidates for admission and degrees must meet the requirements of the Graduate School as outlined in the preceding pages. The work is offered by members of the medical faculty in Minneapolis and by members of the graduate faculty on the Mayo Foundation at Rochester, Minnesota, where part or all the residence work may be done. Several teaching fellowships supported by the University and others on the Mayo Foundation are open to qualified students pursuing graduate work in clinical medicine or in the laboratory branches. A special bulletin on graduate work in medicine is published and may be obtained from the registrar.

### GRADUATE WORK BY UNDERGRADUATES

1. No graduate credit allowed for any courses taken without previous arrangement by petition with the Graduate School.
2. No credit is possible for courses taken by undergraduates who lack more than 9 quarter credits toward the Bachelor's degree.
3. If not more than 9 quarter credits of undergraduate credit are lacking, petition may be filed to carry a limited amount of graduate work (approved courses above 100) for graduate course credit, such courses not to be applied toward an undergraduate degree.
4. With permission of the dean of the undergraduate college concerned, undergraduates lacking not more than 6 quarter credits may be permitted

to register also in the Graduate School. This will be permitted in exceptional cases only.

#### GRADUATE WORK IN LAW

Under certain properly approved conditions graduate students may offer courses in law as a minor for an advanced degree when their major work is in the Department of Political Science or Economics.

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 first law 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 may be elected and additional work in subjects already studied. 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 eight year hours 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.

#### GRADUATE MEDICAL SOCIAL WORK

A course in medical social work leading to the degree of master of arts in sociology may be taken under the direction of the Graduate School of the University. Candidates must hold a Bachelor's degree from a reputable college or university. Students who have not had adequate preparation in their chosen field will require more than one year to attain the Master's degree. For prerequisites, see page 120. Graduate students holding Bachelor's degrees will find it practically necessary to have taken these courses, or take them here. The courses elected within the major subject of sociology and social work must be approved by the adviser, as must the choice of a minor, such as Public Health and Preventive Medicine, Psychology, or Child Welfare. The student must prepare a thesis which will fulfill the Graduate School requirements hereinafter set forth. The field work courses, which are a necessary part of the preparation for a Master's degree in this field, will be given in the Minneapolis General Hospital, and the University Hospital, Minneapolis, the Wilder Dispensary, St. Paul, and the Mayo Clinic, Rochester, Minn. The Mayo Foundation offers several fellowships to qualified students who have completed one quarter of satisfactory work at the University.

#### REQUIREMENTS FOR THE MASTER'S DEGREE

The degree of master of arts is, in general, conferred for advanced non-technical study; the degree of master of science, for advanced technical study, such as agriculture, industrial chemistry, engineering, etc.

The requirements for the degree of master of arts or master of science are covered in general by the statement that these degrees may be earned

by properly qualified students only by at least one full academic year's work (three quarters) in residence at this University. Students who have not had adequate preparation in the specific chosen field of work, or who are doing outside work in excess of ten hours a week, will require more than one year to attain the Master's degree.

Upon entrance to the Graduate School, the candidate, with the approval of the dean, will select his adviser in the field of his major work. With the approval of his adviser and the dean, he will also select a minor, and will outline a study program for the year.

#### PROGRAM OF STUDY

A full program for a student who expects to meet the requirements in one academic year must cover the necessary courses in the fields of the major and minor and the preparation of a satisfactory thesis. The work must be selected from graduate courses offered in this bulletin and must amount to not less than 6 nor more than 9 credit hours each quarter. In addition, thesis work (or courses upon which the thesis is based) should be carried to make a total of not less than 15 hours per week for three quarters. In general, 9 quarter credits in the minor and 18 quarter credits in the major, in addition to the thesis (or courses upon which the thesis is based), is regarded as the minimum program for the Master's degree.

In all courses open to graduates only the student must secure a mark of "Pass." This will be interpreted as the instructor's approval upon the quality of the student's work viewed from the level upon which real graduate work is supposed to be carried on. In the courses open to both graduates and undergraduates the system of marking by letters may be continued for the present. A grade of not less than B must be obtained in any course of this character offered as fulfilling the requirements in the major. A grade of not less than C must be obtained in minor courses.

#### THE MAJOR

The major work must be in a department in which the candidate has had at least three years of work (18 semester or 27 quarter credits) if it be a department open to freshmen, or two years of work (12 semester or 18 quarter credits) if it be a department not open to freshmen. Part or all of this preliminary work may consist of designated prerequisite courses in the same or allied departments. Any special requirements will be noted in the corresponding departmental statement. At the end of the year, a final written examination (in addition to the usual course examinations) will be given in the major as noted below.

#### THE MINOR

The minor subject must be selected in a department in which the candidate has had at least one year's work (6 semester or 9 quarter credits), or he must have had in a closely allied department a year's work (6 semester or 9 quarter credits), which is actually designated as a prerequisite to the minor subject. Any special requirements will be noted in the corresponding departmental statements.

The choice of the minor must be in a department whose work can be logically related to that of the department in which the student is doing his major work. The dean and the group committee may in exceptional cases allow the minor subject to be taken in the same department as that of the major.

#### LANGUAGE REQUIREMENT

A reading knowledge of a foreign language, modern or ancient, the language to be determined by the major department, is required of candidates for the Master's degree, unless exemption is made in individual cases with the approval of the Executive Committee of the Graduate School. When no other statement is made in the departmental announcement in this bulletin, a knowledge of either French or German is expected. The candidate shall present to the dean of the Graduate School, not later than the close of the second quarter of residence, a certificate of proficiency in the designated language, signed by the professor in charge of the corresponding language department or his representative.

Candidates for the Master's degree in any department in the language and literature group who register after September 1, 1922, will be required to have a reading knowledge of two foreign languages before they are recommended for the degree.

All examinations to meet the language requirement of the Graduate School, unless otherwise arranged with the language departments, shall be held on the days specified in the calendar at the beginning of this bulletin.

A candidate who fails in a language examination for an advanced degree shall not be given a second examination until the following quarter.

#### MASTER'S THESIS

Before the middle of the first quarter in residence the candidate shall file at the office of the Graduate School the subject of his thesis. This subject must be approved by his adviser and by the corresponding group committee. It should be on a topic falling within the field of the major. The candidate will ordinarily devote approximately one-half his time to the preparation of the thesis, including courses on which the thesis is based. The thesis must be written in acceptable English and show ability to work independently, and give evidence of power of independent thought both in perceiving problems and making satisfactory progress toward their solution. Familiarity with the bibliography of the special field and correct citation of authorities are expected.

The thesis is required to be in quadruplicate in order to facilitate its consideration. Two copies are retained for the University Library (as noted below), the third copy being finally returned to the candidate. The fourth copy is necessary in cases where the department or adviser desires to retain a copy. Since one copy is usually desired by the adviser or department concerned, a fourth copy should be provided for this purpose. One copy must be upon the specially required red-ruled linen stock, and

the others may be carbon copies on bond paper. Ample margin should be left for binding purposes. Samples in the dean's office of both the linen stock and carbon paper should be examined before the thesis is typewritten. The body of the thesis should be double spaced, but footnotes may be single spaced.

The thesis must be finished and four copies deposited in the office of the dean of the Graduate School at least six weeks before the candidate presents himself for his degree.

The thesis will be examined by a committee of three, appointed by the dean on the recommendation of the group committee. The student's adviser will, as a rule, be the chairman of this committee. Unanimous approval by this committee will be necessary for the acceptance of the thesis.

If the thesis is accepted, the candidate must deposit with the registrar, at least one week before commencement, the sum of one dollar and fifty cents for binding one copy of this thesis, which will be cataloged and deposited in the University Library. This copy cannot be taken from the library. The second copy, however, may be borrowed from the library.

#### EXAMINATIONS

All candidates for this degree will meet the regular requirements as to examinations, topics, reports, etc., of the classes in which they are registered. A special examination in the field of the minor is not required, but this does not excuse the candidate from the regular course examinations. Besides the usual course examinations, where such are given, the candidate for the Master's degree must pass a final written examination in the major and after acceptance of the thesis, a final oral examination.

The final written examination will be held not later than four weeks before the end of the quarter in which he takes his degree. It will cover the work of the candidate in the field of the major, and may include any work fundamental thereto. This examination will be held by his instructors in the major department, the adviser acting as chairman.

If the final written examination is satisfactory, and the thesis accepted, the final oral examination of the candidate will be held, not later than two weeks before the end of the quarter in which he takes his degree. The adviser will act as chairman of the examining committee, which will include all the instructors with whom the candidate has taken work, the thesis committee, and, ex-officio, the head or chairman of the department in which the major work is done. Any member of the graduate faculty may attend as a visitor, and due notice shall be sent by the chairman of the committee to all members of the graduate faculty in the major and minor departments. The final oral examination will cover all the work offered for the degree, and may include other work fundamental thereto. At the close of the examination, the committee will vote upon the candidate, taking into account all of his work. A majority vote is required for approval.

## THE GRADUATE SCHOOL

TABULAR SUMMARY OF REQUIREMENTS FOR  
THE MASTER'S DEGREE

WORK	UNDER THE DIRECTION OF	DATE
Program, major and minor	Adviser and dean of the Graduate School . . . . .	On entrance
Approval of thesis subject	Adviser and group committee . . . . .	Middle of first quarter in residence
Language requirement . . . . .	Adviser and language department . . . . .	Before close of second quarter
Approval of candidacy . . . . .	Executive committee . . . . .	Beginning of third quarter
Filing of thesis . . . . .	Dean of the Graduate School . . . . .	At least six weeks before graduation
Examination of thesis . . . . .	Thesis committee . . . . .	Before admission to final oral examination
Final written examination in major . . . . .	Major department members of the graduate faculty . . . . .	Not later than four weeks before commencement and before final oral examination
Final oral examination on all work . . . . .	Thesis committee; all candidate's instructors; head of major department . . . . .	Not later than two weeks before commencement
(Course examinations as required at the usual times)		
Fee for binding thesis . . . . .	Registrar . . . . .	One week before commencement

Candidates who are eligible for the "preliminary examination" for the Doctor's degree may substitute this examination for the final oral examination for the Master's degree, provided that all other requirements for the preliminary examination (see p. 17) have been met.

*Reports.*—Special blanks are provided for signed reports concerning the thesis and the final oral examinations. All reports must be filed in the office of the dean of the Graduate School at least one week before the end of the last quarter.

Candidates meeting the requirements as above outlined will be reported by the dean to the executive committee of the graduate faculty, who will by vote recommend to the Board of Regents those approved for degrees.

Candidates upon whom degrees are to be conferred are required to be present at commencement, unless especially excused by the dean of the Graduate School and the president of the University.

## MASTER OF SCIENCE IN ENGINEERING OR ARCHITECTURE

The requirements and procedure for the degree of master of science in civil, mechanical, electrical, chemical, or architectural engineering or architecture will correspond to those outlined for this degree in other subjects. The major subject and thesis will lie in the field represented by the degree. The thesis will be filed and final written examination taken at least six weeks before graduation. The language requirement will be waived in all of these cases except chemical engineering, in which German is required.



## THE ENGINEER DEGREES REQUIREMENTS

The advanced professional degrees, civil engineer, mechanical engineer, electrical engineer, chemical engineer, and architectural engineer will be conferred upon the recommendation of the Graduate School faculty as a result of the satisfactory completion of the following requirements:

a. Bachelor's degree, from an approved school in the corresponding branch of engineering.

b. One full academic year of graduate engineering study (three quarters) in residence at this University. Graduates of this University may be permitted to carry on this study *in absentia* under the direction of the faculty. Work done *in absentia* may not be substituted for the residence work required for the master of science.

c. Four years in engineering experience in positions of responsibility, subsequent to receiving the Bachelor's degree. (If the graduate study is done *in absentia*, five years of experience are required.)

d. A thesis of professional grade.

Candidates for the degree of chemical engineer must have a reading knowledge of German.

For graduates of this University, a Master's degree in the corresponding branch of engineering will be accepted as fulfilling the requirements of the year of graduate study.

The Engineer degree will not be granted in less than five years after the Bachelor's degree was received.

If the Bachelor's degree is in another branch of engineering than that in which the professional degree is sought, the student must complete the equivalent of the subjects required for the Bachelor's degree in the new field before admission to candidacy for the desired degree.

### MASTER'S DEGREE WITH THE ENGINEER DEGREE

It is recommended that the student who is entering upon the graduate year's study in residence for the Engineer degree register for and obtain the Master's degree for this year's work, that is, the degree of master of science in the corresponding branch of engineering. The essential difference lies in the requirement of a thesis if the Master's degree is sought. However, the aggregate amount of work is intended to be the same in both cases, namely, from 15 to 18 credit hours per week for the three quarters. If the graduate study does not lead to the Master's degree, the student is not required to prepare a thesis as a part of the year's work. The Master's thesis, however, will not satisfy the requirement for the professional thesis which is intended to be related to the practical experience after the Bachelor's degree was received.

### PLAN OF STUDY

Upon entrance to the Graduate School, the candidate, with the approval of the dean, will select his adviser in the field represented by the desired degree, in which field the major work and the thesis, if one be taken, will

lie. With the approval of his adviser and the dean, he will also select a minor, and will outline a study program for the year.

If the student registers for the Master's degree in engineering or architecture, he will conform to the requirements for that degree as regards major and minor work, thesis, examinations, etc.

If the graduate study during the year of residence or *in absentia* is towards the Engineer's degree only, it will be divided into major and minor work, of which the major will usually constitute about two thirds and the minor one third of the total of 12 to 15 credit hours which will be carried each quarter.

#### STUDY IN ABSENTIA

Only graduates of this University will be permitted to undertake the graduate study *in absentia* towards one of the Engineer degrees. This permission must be obtained from the head of the department represented by the degree, who will usually act as the adviser, and from the dean of the Graduate School. It is not necessary that this study be coincident with the academic year; it may be undertaken at any time.

The proposed plan of study should be arranged with the approval of the adviser. A flat fee of sixty dollars must be paid in advance. The study may, and generally will, extend over more than nine months. There is also the usual graduation fee of ten dollars. At least 1,500 actual hours of work should be performed as the equivalent of a year's study in residence.

The detailed requirements of reports and examinations will be established by the adviser. A separate written report must be submitted at the end of each quarter's work. A written examination covering the entire study, both major and minor, will be held at the close of the year's work. Under favorable circumstances this examination may be held in the place where the candidate resides.

Upon the satisfactory completion of the year's work, the proper credits will be recorded toward the engineering degree.

#### STUDY IN RESIDENCE

The work will consist of regular courses offered in this bulletin and may include research if desired by the student, even tho the Master's degree be not sought.

#### THESIS

At least six months before the graduate degree is expected, the thesis subject must be approved by the adviser and the group committee. The thesis itself must be filed with the dean at least six weeks before the commencement at which the degree is to be obtained together with a deposit of one dollar and fifty cents to cover binding the thesis.

#### STATEMENT OF EXPERIENCE

With the thesis, the candidate must file a detailed statement of his professional experience since receiving his Bachelor's degree. This should amount to at least four years, if the graduate study was in residence, or five, if *in absentia*.

TABULAR SUMMARY OF REQUIREMENTS FOR  
THE ENGINEER'S DEGREE

WORK	UNDER THE DIRECTION OF	DATE
Program, major and minor	Adviser and dean of the Graduate School .....	On registration
Quarterly reports if <i>in absentia</i> .....	Adviser .....	
Written examination .....	Adviser and major and minor staff .....	At end of year's study or later, as arranged
Thesis subject .....	Adviser and group committee .....	Six months before graduation
Experience statement .....	Adviser and major staff...	Six weeks before graduation
Filing thesis .....	Dean of Graduate School..	Six weeks before graduation
Fee for binding thesis.....	Registrar .....	One week before graduation

ATTENDANCE AT COMMENCEMENT

Unless specifically excused for an important reason, the candidate will be present in person to receive the degree.

DOCTOR'S DEGREE

In the Graduate School, one Doctor's degree, doctor of philosophy (Ph.D.), is conferred by the University of Minnesota. This degree is granted, not on the basis of successful completion of a definite amount of prescribed work but chiefly in recognition of the candidate's high attainments and ability in this special field, to be shown, first, by the preparation of a thesis, and second, by successfully passing the required examinations covering both the general and the special fields of the candidate's subjects as detailed later.

Candidates for the Doctor's degree must devote at least three years<sup>1</sup> of graduate study to approved subjects. The first two years or the last year must be spent in residence at the University of Minnesota.

A member of the staff of instruction above the rank of instructor will not be permitted to enroll for a Doctor's degree at this University. There is no objection, however, to his registering for graduate work at this University and credit so obtained may be presented elsewhere.

PROGRAM OF WORK

*First year.*—Upon entrance to the Graduate School, the student shall select his adviser with the approval of the dean. With the approval of his adviser he shall submit to the dean a program covering his first year's work.

<sup>1</sup>This time requirement will be met in three years only by those students who devote all their time to graduate study. Students who merely devote the intervals of professional or other regular employment to graduate study will need to extend their total period of work over a longer period of time. Credit for such work will be given in proportion to the amount of time actually spent in the pursuit of graduate work.

*Second and third years.*—Before beginning the work of the second year, the student shall submit to his adviser and the group committee for approval a tentative outline of his work for the second and third years, including both the major and minor subjects. This program is then to be submitted to the dean for final approval. During the second quarter of the second year he shall file with his adviser's approval the subject of his Doctor's dissertation.

#### LANGUAGE REQUIREMENTS

Before admission to the preliminary examination, the student must present to the dean of the Graduate School statements from the French and German departments, certifying that the applicant has a reading knowledge of those languages.<sup>1</sup> In addition, a knowledge of other languages may be required in certain cases, as the candidate's major department may prescribe. The student's adviser or his representative shall attend the language examinations and provide literature in the major field from which the test passages are selected. For the dates of these language examinations consult the calendar at the beginning of this bulletin.

#### THE MAJOR WORK

The major work must be in a department in which the candidate has had, in his undergraduate study, at least the equivalent of three years of work (18 semester or 27 quarter credits) if it be a department open to freshmen, or two years of work (12 semester or 18 quarter credits) if it be a department not open to freshmen. Part or all of this preliminary work may consist of designated prerequisite courses in the same or allied departments.

During the period of work for the Doctor's degree a student shall spend not less than two thirds of his time<sup>2</sup> on the major subject, including the work of the thesis. During the last two years, he shall carry an average of at least one course per quarter in his major in addition to the work from which this thesis is developed.

At the close of the second year's work, and before admission to the preliminary examination, the student must obtain the written recommendation of the major department members of the graduate faculty. Such written recommendations should state that in view of the work already done by the applicant, the department is convinced of his probable capacity and ability to meet all the requirements for the degree, including the thesis, the subject of which must be stated.

In the case of a student who comes for the last year of residence only, provision for the examination will be made by the dean and the major department.

<sup>1</sup> The substitution of other foreign languages of greater service in the major field may be permitted by the executive committee on recommendation of the group committee.

<sup>2</sup> In estimating the distribution of time, a week of 15 credit hours may be assumed.

## THE MINOR WORK

The minor work must be selected in a department in which the student is prepared to pursue courses advanced enough in character to be included in the group designated "For Undergraduate and Graduate Students," and numbered 100 or above.

The choice of the minor must be in a department the work of which can be logically related to that of the department in which the student is doing his major work.

In exceptional cases, the dean and the group committee may allow the minor subject to be taken in the same department as that of the major or in two related departments.

Not less than one sixth of the total work of the three years shall be devoted to the minor subjects and all of this work shall be completed and certified to by the department in which the minor is taken before admission to the preliminary examination.

## THESIS

The thesis, for which the accumulation of material may well be started not later than the middle of the second year, must give evidence of originality and power of independent investigation, and embody results of research, which form a real contribution to knowledge as well as exhibit mastery of the literature of the subject and familiarity with the sources of knowledge. The matter must be presented with a fair degree of literary skill.

Not later than six weeks before the commencement at which he expects to take the degree, the student shall deposit at the dean's office his thesis, typewritten, in triplicate copy to facilitate reading by the thesis committee. After the final oral examination has been passed, the candidate should file in the office of the Graduate School one bound carbon copy of the thesis. The requirements concerning form, copyrighting, and printing adopted in June, 1922, may be consulted in the Graduate School office.

The dean will appoint a thesis committee, of which the student's adviser will usually be the chairman. The duty of this committee will be to read the thesis and vote upon its acceptance. Unanimous approval by this committee will be necessary to such acceptance.

*Printing of the thesis.*—If the thesis be accepted, the student shall deposit with the registrar, not later than one week before graduation, a sufficient bond or such sum of money as is needed to print one hundred copies of the thesis for the use of the University and as many additional copies as the candidate may require for himself. If the thesis is to be published elsewhere, reprints will be acceptable, if bound with covers in the special form required by the University.

## EXAMINATIONS

*Preliminary.*—After the language examination (see p. 16) and at least seven months before the degree is conferred, a preliminary examination of the student shall be given by a committee appointed by the dean and including the student's adviser as chairman, a representative of the group

committee other than his adviser, the chairman or head of the major department, a representative of the minor department, and such other members as the dean may consider advisable. Certificates of proficiency in French and German and completion of the minor and the recommendation of the major department shall be required before admission to this examination. The examination shall cover graduate work previously taken by the student, and *may include any work fundamental thereto*, except the thesis and the field of definite specialization. This examination shall be in addition to the usual course examinations. It may be written or oral, or both, at the discretion of the committee. Only after the successful completion of this examination may the student be enrolled as a candidate for the Doctor's degree. Students failing to pass this preliminary examination may be excluded from candidacy for the degree and in any case shall not be re-examined until at least one quarter has passed.

*Final written.*—After the thesis is presented, and at least four weeks before examination, there shall be a written examination in the major subject, to be given by the members of the graduate faculty in the major department. This examination shall cover all the work done in the major, and *may include any work fundamental thereto*.

*Final oral.*—After successful completion of the written examination and acceptance of the thesis and not less than two weeks before graduation, the final oral examination shall be given. This examination shall be conducted by a committee consisting of the adviser as chairman, of a majority of the members of the graduate faculty of the department in which the major work was done, and at least three other members of the graduate faculty appointed by the dean. At least one member of this committee shall be from a group other than the one in which the major department is included. This examination has special reference to the thesis and the field of the candidate's special studies and shall not exceed three hours.

The date of the final oral examination shall be publicly announced and the examination shall be open to any member of the graduate faculty. Upon completion of the examination, a formal vote of the committee shall be taken, and an affirmative vote of at least two thirds of the members shall be necessary for recommendation of the candidate for the degree.

*Reports.*—Special blanks are provided for signed reports concerning the thesis and the final oral examinations. All reports must be filed in the office of the dean of the Graduate School at least one week before graduation.

Candidates meeting the requirements as above outlined will be reported by the dean to the executive committee of the graduate faculty, who will by vote recommend to the Board of Regents those approved for degrees.

Candidates upon whom degrees are to be conferred are required to be present at commencement, unless especially excused by the dean of the Graduate School and the president of the University.

TABULAR SUMMARY OF REQUIREMENTS FOR  
THE DOCTOR'S DEGREE

WORK	UNDER THE DIRECTION OF	DATE
<b>FIRST YEAR</b>		
Major .....	} Adviser and dean of the Graduate School .....	On registration
Minor .....		
<b>SECOND YEAR</b>		
Tentative program of entire second and third year's work	Adviser, group committee, and dean of Graduate School .....	Before beginning work of second year
Major, including thesis....	As for tentative program..	} Before admission to preliminary examination
Minor .....	Adviser and minor department .....	
Language .....	Adviser and language department .....	
Recommendation .....	By major department.....	
Preliminary examination...	Special committee .....	Seven months before degree is to be conferred
<b>THIRD YEAR</b>		
Major, including thesis....	Advisers, group committee, and dean of Graduate School .....	
Filing of thesis.....	Dean .....	Six weeks before taking the degree
Examination of thesis.....	Thesis committee .....	Before admission to final oral examination
Final written examination..	Major department members of the graduate faculty..	Four weeks before taking degree and before final oral examination
Final oral examination....	Advisers, majority of members of major department, and other members appointed by dean of Graduate School.....	Not later than two weeks before taking the degree
Bond for publication of thesis .....	Registrar .....	Not later than one week before taking the degree

## DESCRIPTION OF COURSES

### EXPLANATIONS

A *dagger* (†) indicates that all quarters of a course must be completed before credit is received for any quarter.

### AERONAUTICAL ENGINEERING

Assistant Professors Charles Boehnlein, Gustav O. Hoglund

- 100f-101w-102s. Aerodynamics. Properties of the atmosphere. Resistance of simple bodies. Lift and drag of wings. Theory of propellers. Control surfaces and stability. Prediction of airplane performance. Dynamics loads. Maneuverability and controllability. Structural requirements. Prerequisite: M.&M. 26. Three credits per quarter. Mr. Boehnlein.
- 120f-121w-122s. Airplane Design. Performance curves. Stresses in wings, fuselage, and chassis. Control surfaces. Propellers. Prerequisites: Aero.E. 102, M.&M. 128, C.E. 37. Three credits per quarter. Mr. Hoglund.
- 140f. Aeronautical Laboratory. Study of airplane parts and their construction. Fittings. Rigging. Prerequisite: Aero.E. 102. Two credits. Mr. Hoglund.
- 141w. Aerodynamics Laboratory. Measurement of air flow. Calibration of Pitot tubes and anemometers. Distribution of air pressure on surfaces. Wind tunnel tests of model wings and propellers. Prerequisite: Aero.E. 102. Two credits. Mr. Boehnlein.
- 160s. Airships. Theory and design. Rigid and non-rigid types. Stresses. Performance. Prerequisites: Aero.E. 102, M.&M. 128, C.E. 37. Three credits. Mr. Hoglund.
- 170s. Air Transport. Economic problems. Airports and airways. Lighting for night flying. Prerequisites: Aero.E. 102, C.E. 17. Two credits. Mr. Hoglund.
- 190f-191w-192s. Seminar. Readings, reports, conferences, and discussions. Prerequisite: Aero-E. 102. One credit per quarter. Mr. Boehnlein, Mr. Hoglund.

### AGRICULTURAL BIOCHEMISTRY

Professors Ross Aiken Gortner, Clyde H. Bailey, Leroy S. Palmer; Assistant Professors Cornelia Kennedy, William M. Sandstrom.

*Prerequisites.*—For major work, credit in general chemistry and qualitative analysis, in organic chemistry, in quantitative analysis, and at least ten quarter credits in biological science. The work presented as prerequisite must be satisfactory to the instructor with whom the student wishes to work.



For minor work, credit in general chemistry and qualitative analysis, in organic chemistry, and 10 quarter credits in biological science. Minors should be arranged only after consultation with the instructors concerned.

All students majoring in this division and all minoring for the Doctor's degree must include either Course 201 or 202 in their study programs.

Candidates for the Master's degree must have a reading knowledge of German or French. (In special cases, where other languages are needed for the development of the thesis, Russian, Italian, or the Scandinavian languages may be substituted.)

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w. Agricultural Quantitative Analysis. Includes estimation of inorganic and organic constituents of biological products, proximate analysis of foods and feeding stuffs, and the use of special apparatus. Prerequisite: quantitative analysis. Three credits each quarter. MWF VI, VII, VIII; 208BCh.
- 103s. Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, and of the processes involved in the manufacture of dairy products. Lect. three credits, lect. and lab. five credits. Lect. MWF VI; Lab. MWF VII, VIII, IX; 116 and 208BCh. Mr. Palmer.
- 106f,w,s. Biochemistry in Industry. A seminar course. Prerequisite: organic chemistry. One credit each quarter.<sup>1</sup> Ar. Mr. Bailey.
- 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. Prerequisite: organic chemistry. Three credits. MWF I; 211BCh. Mr. Bailey.
- 110s. Flour Laboratory Methods. A laboratory course. Analysis of wheat and its products. Designed to train students for research in the cereal industry. Prerequisites: Course 101-102 or food analysis. Three, four, or five credits depending on the amount of work completed. MWF VI, VII, VIII, IX; 202BCh. Mr. Bailey.
- 111f,su-112w,su. Biochemistry. An advanced course dealing with the colloidal state, and the chemistry of proteins, carbohydrates, glucosides, tannins, fats, plant acids, enzymes and pigments, and their physico-chemical relations to vital processes. Prerequisites: organic chemistry, biology, 1 year. Three credits each quarter. Lect. MWF III; Rec. Th VI; 113BCh. Mr. Gortner.
- 113f,su-114w,su-115s. Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 111-112. Prerequisite: quantitative analysis, parallel 111-112. Two credits each quarter. T VI, VII, VIII; Th VII, VIII, IX; 202-208BCh. Mr. Sandstrom.
- 116w. Advanced Animal Nutrition. Recent developments in animal nutrition, covering the field of proteins, mineral metabolism, and vitamins.

<sup>1</sup> Not more than 6 credits can be earned by registering for Course 106.

- Prerequisite: Course 111 or physiologic chemistry. Three credits. TS IV; Th III; 116BCh. Mr. Palmer, Miss Kennedy.
- 117f,w,s. Laboratory Problems in Animal Nutrition. A laboratory course on methods used in nutrition studies. (Because of limited laboratory facilities permission should be obtained from the instructor before registration.) Prerequisite: Course 116.<sup>1</sup> Three credits. Ar. Miss Kennedy.
- 118f,w,s,su. Laboratory Problems in Biochemistry. Special laboratory work in the preparation and isolation of pure compounds, and in special methods of identification or determination of biochemical products. Prerequisites: Courses 111-112, 113-114; or 103 or 110. Three or five credits. Mr. Gortner, Mr. Bailey, Mr. Palmer, Miss Kennedy.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f,w,s. Seminar in Plant Chemistry, Colloids, and Proteins. One credit. F IX; 310BCh. Mr. Gortner, Mr. Bailey.
- 202f,w,s. Seminar in Nutrition and Dairy Chemistry. One credit. Ar. Mr. Palmer, Miss Kennedy.
- 203f,w,s,su. Research Problems. Special work on particular research problems other than the student's major thesis. Facilities are provided for biochemical investigations and for advanced studies in plant or animal nutrition. Two to 5 credits. Mr. Gortner, Mr. Bailey, Mr. Palmer, Miss Kennedy.
- 205f,w,s,su. Special Topics in Biochemical Literature. Library work followed by the preparation of written reports upon either the historical development or the current literature of special biochemical problems. A reading knowledge of German is necessary and of French desirable. Prerequisite: Course 206, 207, or 208. Three credits. Mr. Gortner, Mr. Bailey.
- 206f. Colloids. Lectures dealing with the colloidal state, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. Prerequisite: Course 111-112, or physical chemistry. Three credits. MWF II; 113BCh. Mr. Gortner.
- 207s. Enzymes. A lecture and library course on the nature of enzyme action, including methods of preparation and investigation of enzymes, their physical and chemical properties and their methods of action. Prerequisites: Course 111-112, or physiologic chemistry. Three credits. MWF III; 116BCh. Mr. Sandstrom.
- 208w. Proteins. Lectures on the composition, structure, physical chemistry, biochemical reactions, and functions of the proteins and amino acids. Prerequisite: Course 111-112, or advanced organic chemistry. Three credits. MWF II; 113BCh. (Offered in alternate years; offered in 1929-30.) Mr. Gortner.
- 209w. Carbohydrates. A lecture and library course on the synthesis, structure, reactions, and functions of carbohydrates, with especial reference

<sup>1</sup> Graduate students with acceptable prerequisites may be permitted on request to parallel Courses 116 and 117.

to those which play a rôle in biochemical or industrial processes. Prerequisite: Course 111-112 or advanced organic chemistry. Three credits. MWF II; 116BCh. (Offered in alternate years; not offered in 1929-30.)

212f,w,s. Special Topics in Nutritional Chemistry. A special library course with written reports on assigned readings in protein, mineral, and vitamin nutrition, primarily to train the student as a critic in this field. Prerequisite: Course 116 and reading knowledge of German. Three credits. Mr. Palmer.

### AGRONOMY AND PLANT GENETICS

Professor Herbert K. Hayes; Associate Professor Albert C. Arny; Assistant Professors Harvy E. Brewbaker, Frederick J. Stevenson, Harold K. Wilson.

*Prerequisites.*—In agronomy, sufficient work in plant science to satisfy the adviser that advanced work may be pursued profitably. Further courses may be required without credit if in the opinion of the adviser this is necessary. With the approval of the adviser, courses in agricultural biochemistry, pathology, plant genetics, plant physiology, and soils may be accepted as part of the major work.

In plant genetics, for major or minor work, sufficient credits in plant sciences must be presented to satisfy the adviser. With the approval of the adviser, courses in agricultural biochemistry, agronomy, botany, horticulture, plant physiology, and plant pathology may be accepted as major work. Students majoring in plant genetics are required to continue study during at least one summer. Exemption is made if similar training has been obtained at some other institution.

### COURSES IN AGRONOMY

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 121f. Grain Crops. Structure, function, culture, improvement, and uses of corn, wheat, oats, barley, rye, flax, and buckwheat. Prerequisites: Bot. 4, 5, 6. Three credits. TTh VI, VII, VIII; 100Ad(F). Mr. Wilson.
- 122w. Grain and Hay Grading. History and methods of grain grading. Problems involved and applications of work. Judging crops on basis of quality for seed. Prerequisite: Agron. 121, or equiv. Three credits. TTh VI, VII, VIII; 100Ad(F). Mr. Wilson.
- 123s. Forage Crops. A study of the structure, function, culture, improvement, and uses of forage crops including meadow and pasture management. Prerequisite: Bot. 4, 5, 6. Three credits, TTh VI, VII, VIII; 100Ad(F). Mr. Arny.
- 124w,s. Problems in Farm Crops. Correlation of theory and practice of crop production and management by the problem method. Prerequisites: Agron. I, 121, and 123 (parallel). Three credits. Ar; 109Ag(F). Mr. Wilson.

- 125su. Advanced Farm Crops. The important phases of crop production in the light of modern scientific knowledge. Studies of the important agricultural crops with emphasis as follows: ecology in relation to crop distribution and adaptation, physiology of crop production and plant nutrition, anatomy of the plant as related to growth responses, environmental factors as diseases, insects, etc., tillage practices, maintenance of soil productivity, and methods of plant improvement through plant breeding. Prerequisites: qualified teachers in agriculture. Three credits. Ar. Mr. Wilson.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f,w,s. Research in Farm Crops. Special problems in crop physiology, production, and classification of crop plants. Prerequisites: Agron. 121, 123. Three to nine credits. Ar. Mr. Arny, Mr. Wilson.
- 202f,w. Farm Crops Seminar. Weekly meetings for reviews and discussions of research articles and thesis problems. Prerequisites: 9 credits in farm crops. One and one-half credits per quarter. W VIII, IX; 109Ag(F). Mr. Arny.
- 203s. Methods in Farm Crops Research. Studies in the interpretation of the published results from investigations with crop plants and the applications of the results of agronomic problems together with practice in outlining plans for research in agronomy. Prerequisites: Agron. 121, 123. Three credits. 109Ag(F). (Offered in alternate years; offered in 1929-30.) Mr. Arny.
- 204s. History and Classification of Crop Plants. Assignments, discussions, and laboratory work dealing with (a) the botany of crop plants and their evolution; (b) use of plant characters in the identification and systematic classification of species and varieties. Prerequisites: Bot. 113 or 114 or 115; Agron. 121 and 123. Three credits. 109Ag(F). (Offered in alternate years; offered in 1930-31.) Mr. Wilson.

#### COURSES IN PLANT GENETICS

##### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 131f,w. Principles of Genetics. Fundamental principles of breeding, heredity, variation, biometry, and evolution. Prerequisites: 9 credits in botany or zoology. Three credits. ThS I, T I, II; 102Ad(F). Mr. Stevenson.
- 132s. Farm Crops Plant Breeding. Applied genetics. Methods of breeding each of the important agricultural crops. Prerequisites: Course 131 or its equivalent. Three credits. ThS I, T I, II; 102Ad(F). Mr. Stevenson.
- 134f,w. Laboratory Problems in Genetics. Methods of taking and arranging genetics data. Special inheritance problems with *Drosophila*. Construction of chromosome map. May parallel Course 131. Ar; 303 Ag(F). Mr. Brewbaker.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 241f,w,s. Research in Plant Genetics. Special problems in plant genetics, inheritance of plant characters, and cytological studies in relation to plant genetics. May be taken as major or minor work. Ar. Mr. Hayes, Mr. Brewbaker, Mr. Stevenson.
- 242f,s. Plant Breeding Seminar. Plant genetics in relation to plant breeding, and a discussion of research problems. One credit per quarter. F VII, VIII; 109Ag(F). Mr. Hayes.
- 243f. Methods in Plant Breeding. The application of biometrical methods to field plot technique, the results of inbreeding and outbreeding, and the results of selection and crossing as a means of improving crop plants. Practice in outlining the correct mode of attack for special plant breeding problems. Three credits. Ar; 109Ag(F). Mr. Hayes.
- 244su,f. Laboratory Methods in Plant Breeding. Supplementing 243f. Practice in plant breeding technique, methods of controlling pollination, and handling of plant cultures. Three credits. Ar. Mr. Stevenson.
- 245w. Advanced Genetics. The establishment of a genetic factor hypothesis, linkage, gene mutations, chromosomal aberrations, and the goodness of fit of Mendelian ratios will be emphasized. Three credits. Ar; 109Ag(F). Mr. Hayes.
- 246w. Genetics Seminar. Important contributions to genetic theory and practice. Two credits. F VII, VIII; 109Ag(F). Mr. Hayes.

## ANATOMY

*Prerequisites.*—The Institute of Anatomy offers excellent facilities to students who wish to take advanced work or to pursue investigations in anatomy.

The prerequisite work for all students for major or minor in the Department of Anatomy includes general zoology (animal biology), 6 credits, and advanced zoology or elementary courses in anatomy (including histology, embryology, and neurology), 6 credits. In addition each student desiring a major in anatomy must have had the elementary courses in that branch of anatomy in which he desires to specialize—gross anatomy, histology, embryology, or neurology.

For staff and the description of courses, see the special bulletin on graduate work in medicine.

## ANIMAL BIOLOGY

For offerings see Zoology.

## ANIMAL HUSBANDRY

Professors Walter H. Peters, Evan F. Ferrin; Associate Professor Laurence M. Winters; Assistant Professor Alfred L. Harvey.

*Prerequisite.*—Students majoring in this division are exempted from the language requirement for the Master's degree.

With the approval of the adviser, courses in agricultural biochemistry, genetics, botany, economics, dairy husbandry, and veterinary medicine may be accepted as major work.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f. Advanced Livestock Judging. Competitive judging of all types, breeds, and classes of livestock supplemented by visits to near-by stock farms. Three credits. MWF VI, VII; center arena, St(F). Mr. Ferrin.
- 102s. Horse Husbandry. Stud farm management; the selection of foundation stock and the breeding, feeding, and marketing of horses. Horse power; factors determining a horse's efficiency for work. Three credits. TTh II; 3St(F) and F V, VI, VII; center St(F). Mr. Harvey.
- 103s. Beef Cattle Husbandry. The management of purebred and grade herds of beef cattle, sales and shows, building equipment, labor, with practical exercises. Three credits. MW III; 3St(F) and T V, VI, VII; BB. Mr. Peters.
- 104s. Sheep Husbandry. Similar in method to 103, with practice in shearing, blocking, feeding, and caring for lambs. Three credits. WF IV; 3St(F) and M VI, VII, VIII; center St(F). Mr. Anderson.
- 105s. Swine Husbandry. Topics of 103 as applied to swine production, marketing, costs, feeding, etc. Three credits. TS III; 3St(F) and T V, VI, VII; center St(F). Mr. Ferrin.
- 106w. Advanced Meats. Practice work in dressing animals and cutting carcasses; also a study of the chemical composition of meat. Three credits. WF V, VI, VII; Meat Shop. Mr. Anderson.
- 108f. Seminar. Special assignments and review of investigations pertaining to the livestock industry. One credit. Mr. Peters.
- 109w. Seminar. Continuation of 108. One credit. Mr. Peters.
- 110s. Seminar. Continuation of 109. One credit. Mr. Peters.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

201. Advanced Study of Livestock Breeding. Studies of the methods followed in the building up of breeds of livestock and distinguished blood lines within the breeds. Review of scientific literature on livestock breeding. Three to ten credits. Mr. Winters.
202. Advanced Livestock Feeding. A study of experimental results bearing upon feeding questions and review of scientific literature applicable to them. Three to ten credits. Mr. Ferrin.
203. The Marketing of Livestock. A study of the methods used in the principal livestock markets. Three credits. Mr. Peters.
204. Advanced Study of the Breeds of Livestock. A study of the history, development, characteristics, and blood lines in any of the leading breeds of livestock. Three credits. Mr. Winters.
205. Experimental Methods. Theory, plan, and conduct of experimental work in animal husbandry. Factors affecting results, sources of error, interpretation of data. Three credits. Mr. Ferrin.

207. Meat Problems. The wholesale cuts and grades of meat, the packing industry and utilization of by-products, special problems and visits to meat packing establishments. Three to nine credits. Mr. Anderson.
208. Research in Animal Husbandry. Special problems assigned to fit the needs of each student. Mr. Peters, Mr. Ferrin, Mr. Winters, Mr. Anderson.

## ANTHROPOLOGY

Professors Albert Ernest Jenks, Wilson D. Wallis.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 106f. Types of Prehistoric Men and Cultures. Problems of chronology and distribution. MWF III; 12F. Mr. Jenks.
- 108s. Philippine Peoples. Ethnology of the Philippines. (Alternates annually with 112.) MWF IV; 15F. Mr. Jenks.
- 110f. Physical Anthropology. The physical types of man, prehistoric and contemporary. TThS III; 12F. Mr. Wallis.
- 112s. The American Negro. The physical types. Problems and methods of interracial adjustments. MWF IV; 15F. (Alternates annually with 108.) Mr. Jenks.
- 113w. Peoples of Europe. Racial and cultural characteristics. MWF II; 15F. Mr. Jenks.
- 114f. American Peoples. The physical, psychic, and cultural characteristics of the peoples in America. MWF IV; 15F. Mr. Jenks.
- 121w. Advanced Physical Anthropology. A critical study of problems in physical anthropology. Based on 110. TThS III; 12F. Mr. Wallis.
- 122f-123w-124s. Problems in Anthropology. Advanced work with individual guidance. Also honors course, anthropological backgrounds of the social sciences, on recommendation of their advisers. Hours and credits arranged. Mr. Jenks, Mr. Wallis.

## COURSE PRIMARILY FOR GRADUATE STUDENTS

- 204f-205w-206s. Seminar in Anthropology. Individually directed research. Three credits each quarter. Hours arranged. 12F. Mr. Jenks, Mr. Wallis.

## ARCHITECTURE

Professors Frederick M. Mann, Leon E. Arnal, Robert T. Jones; Associate Professors S. Chatwood Burton, Roy C. Jones.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 121f,w,s-122f,w,s-123f,w,s. Freehand Drawing. Advanced life drawing, painting, or modeling and decoration. Prerequisite: Course 29. Two credits per quarter. Mr. Burton.
- \*131f,w,s-132f,w,s-133f,w,s. Architectural Design, Grade III. Long, short, and sketch problems under individual criticism dealing with more complex kinds of architectural composition, especially with subjects involv-

\* See (\*) footnote on page 28.

- ing special character and a decorative and imaginative interest. Prerequisite: Course 39. Ten credits per quarter for 131 and 132; nine credits for 133. Mr. Arnal, Mr. R. C. Jones.
- \*134f,w,s-135f,w,s-136f,w,s. Interior Decoration Design. Problems done under individual criticism dealing with the decorative treatment, furniture, and accessories of interiors. for students in interior decoration. Prerequisite: Course 36. Seven credits per quarter. Mr. Arnal.
- 141f-142w-143s. Building Construction. An advanced study of the technology of building materials, soils, foundations, systems of framing, and fireproof and mill construction. Prerequisite: C.E. 41 or M.&M. 26. Two credits per quarter. Mr. R. T. Jones.
- 151f. Architectural Seminar. Literature of architecture, special topics and topics of current interest, papers, and discussions. Prerequisite: senior standing. One credit. Mr. Mann.
- 153s. Business Relations. Relations of the architect, owner, and builder; professional ethics and practice; office administration. Prerequisite: Econ. 28. Two credits. Mr. Mann.
- 163s. History of Sculpture and Painting. Historical study of ancient Renaissance and modern sculpture, and of the Renaissance and modern schools of painting. Prerequisite: senior standing. Two credits. Mr. Burton.
- 182f-183w-184s. Furniture and Decoration. Historical and technical study, for students in architecture and decoration, of ornament, decoration, furniture, etc., together with discussion of the use of color in decoration. Prerequisites: Courses 16, 26. Three credits per quarter. Mr. Mann.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 219f,w,s. Special Researches in Architectural History. Prerequisite: completion of undergraduate architectural history. Five credits or less per quarter. MW III; 320ME. Mr. Mann.
- 220f,w,s. Archeology. Prerequisite: completion of undergraduate architectural history. Three credits or less per quarter. Hours arranged. Mr. Arnal.
- 221f,w,s. Life Drawing and Figure Composition. Prerequisite: completion of undergraduate freehand drawing. Two credits per quarter. Hours arranged. Mr. Burton.
- 239f,w,s. Advanced Architectural Design. Prerequisite: completion of undergraduate design. Ten credits or less per quarter. MTWThF VI, VII, VIII, IX; S I, II, III, IV; 317ME. Mr. Arnal.
- 240f,w,s. Technology of Building Materials. Prerequisite: Arch. 143. Three credits per quarter. Hours arranged. Mr. R. T. Jones.

\* Work in all design courses is carried on simultaneously and students pass from one grade to the next in sequence in varying lengths of time according to their accomplishment and irrespective of university time units. The normal time required to complete the design courses is three years; some students require more time and some less. Advancement is based upon design "points" earned. For graduation, in addition to a passing grade in each quarter's work, the student must earn 192 points in Grade I, 336 points in Grade II, and 480 points in Grade III.



- 243f,w,s. Advanced Interior Decoration Design. Prerequisite: Arch. 136. Ten credits or less per quarter. Hours arranged. Mr. Arnal.
- 287f,w,s-288f,w,s-289f,w,s. Advanced Modeling. Continuation of Arch. 89. Prerequisite: Course 89. Two credits per quarter. Mr. Burton.

### ASTRONOMY

Professor Clifford C. Crump; Assistant Professor William O. Beal.

The Astronomical Observatory contains a ten and one-half inch refracting telescope furnished with a third lens for converting it into a photographic telescope; a five-inch star camera; a filar micrometer; a spectroscope by Brashear; a meridian circle and zenith telescope; a Repsold photographic measuring machine; a chronograph, and astronomical clocks.

*Prerequisites.*—For major work, Course 51-52-53 and Mathematics 50; for minor work, Mathematics 50 and 3 credits in astronomy.

Exemptions from the language requirement for the Master's degree may be made in individual cases.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w-103s. Practical Astronomy. Theory and use of astronomical instruments; astronomical photography, with measures of plates; study of method of least squares. Prerequisite: Mathematics 50. Three credits. Ar. Mr. Beal.
- 111f-112w-113s. Celestial Mechanics. Prerequisite: Mathematics 51. Three credits. Ar. Mr. Beal.
- 121f-122w-123s. Astrophysics. An introductory course, with particular reference to stellar spectroscopy. Practice in measurement of spectrographic plates. Three credits. Ar. Mr. Crump.
- 140w. Method of Least Squares. Applied especially to engineering, physics, and astronomy. Prerequisite: Mathematics 51. Three credits. Ar. Mr. Beal.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Advanced Practical Astronomy. Prerequisite: Astronomy 101-102. Three credits. Ar. Mr. Crump.
- 204f-205w-206s. Astrophotography. Prerequisite: Astron. 102. Three credits. Ar. Mr. Crump.
- 208f-209w-210s. Calculation of Orbits. Prerequisite: Mathematics 51. Three credits. Mr. Beal.
- 211f-212w-213s. Seminar. For students who are prepared for advanced work along particular lines. One, two, or three credits. Ar. Mr. Crump.

### BOTANY

Professors J. Arthur Harris, William S. Cooper, C. Otto Rosendahl, Josephine E. Tilden; Associate Professors George O. Durr, Frederic K. Butters, Rodney B. Harvey.

NOTE.—For courses in plant pathology and mycology, see Department of Plant Pathology.

*Prerequisites.*—For major work, 36 quarter credits in botany; for minor work, 20 credits.

*Language requirements.*—Candidates for the Master's degree must have a reading knowledge of German or French; for the Doctor's degree, both are required.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. Elementary Biometry. An introduction to the mathematical analysis of biological data. Prerequisite: 18 credits in biological sciences (or other advanced work approved by the instructor). Three credits. MWF I-II; 202Bot. Mr. Harris.
- 108w. Morphology and Taxonomy of the Pteridophytes. An intensive study of lycopods, ferns, and their allies, their structure and history, with special attention to the classification of living forms. Lectures, reference reading, and laboratory work. Prerequisites: Courses 7 and 23. Five credits. Ar; 304Bot. Mr. Butters.
- 110w. Morphology and Taxonomy of the Gymnosperms. An intensive study of cycads, conifers, and their allies, their structure and history, with special attention to the classification of living forms. Lectures, reference reading, and laboratory work. Prerequisites: Courses 7 and 63. Five credits. Mr. Butters.
- 113i-114w-115s. Advanced Taxonomy of the Flowering Plants. An advanced course in which special attention is given to the taxonomy of difficult natural groups, involving systematic principles and practice, rules of nomenclature, systems of classification, etc. Prerequisite: 15 credits, including Course 7. Nine credits. TTh VI, VII, VIII; 303Bo. Mr. Rosendahl.
- 118w. Cytology. A survey of cell structure and the various phenomena of division, fusion, and metamorphosis, together with a review of the history of cytological investigations. Methods of cytological research indicated in the laboratory. Prerequisite: 18 credits. Five credits. MTWThF I, II; 303Bot. Mr. Rosendahl.
- 125s, su-126su, f. Morphology and Taxonomy of Marine Algae. Advanced studies in selected groups. Prerequisite: 15 credits including Course 12, or consent of instructor. Three to five credits. TThS III, IV; 110Bot. Miss Tilden.
- 127s. Anatomy of Vascular Plants. The microscopic structure of vascular plants with particular attention to the development and evolution of the vascular system in the root, stem, and leaf. Prerequisite: 18 credits. Five credits. Laboratory ar. Lecture MWF I; 304Bot. Mr. Butters.
- 131f. Field Ecology. A survey of the local plant communities and successions, and a study of the general principles of plant association and succession. Prerequisite: Course 21. Five credits. MWF VI, VII, VIII; 214Bot. Mr. Cooper.
- 132w. Ecological Anatomy. The individual plant and its parts as related to environment; special plant forms and structures, their causes and significance. Prerequisite: Course 21. Five credits. MWF VI, VII, VIII; 214Bot. Mr. Cooper.

- 133s. Plant Geography of North America. Preliminary discussion of the principles of plant distribution followed by a detailed study of the vegetation regions of North America. Prerequisite: Course 21. Five credits. MWF VI, VII, VIII; 214Bot. Mr. Cooper.
- 134s. Research Methods in Ecology. Theory and practice of instrumental study of the habitat and of precise investigation of community and succession. Prerequisite: Course 21. Five credits. MWF VI, VII, VIII; 214Bot. Mr. Cooper.
- 140f,w. General Plant Physiology. Advanced survey of the whole field of plant physiology. Prerequisites: Course 22 and elementary inorganic chemistry. Five credits. MTWThF VI, VII; 102Bot. (Not offered in 1929.) Mr. Burr.
- 141f. Physico-chemical Principles in Plant Physiology. Properties of solution, buffers, osmosis, transpiration, electrometric measurements. Prerequisites: Course 22 and general organic chemistry. Five credits. Lect. MWF 7:50 a.m. Lab. MF II, III, IV; 104Bot. Mr. Burr.
- 142w. Photosynthesis. A detailed discussion of conditions, theories, and energy relations in the assimilation of carbon. Prerequisites: Course 2 and general organic chemistry. Five credits. Lect. MWF 7:50 a.m. Lab. MF II, III, IV; 104Bot. Mr. Burr.
- 143s. Plant Metabolism. Nitrogen assimilation and protein synthesis, metabolism of carbohydrates, fats and proteins, biological oxidation, respiration. Prerequisites: Course 22 and general organic chemistry. Five credits. Lect. MWF 7:50 a.m. Lab. MF II, III, IV; 104Bot. Mr. Burr.
- 144s. Plant Microchemistry. A study of the location of materials of physiological importance in the plant and their relation to physiological processes. Prerequisites: Courses 22 and 140 and general organic chemistry. Five credits. Ar; 102Bot. Mr. Harvey.
- 145f,146w,147s. Advanced Biometry. Theory and practical exercises in the statistical analysis of biological data. Prerequisite: Course 101. Nine credits. MWF III, IV; 202Bot. Mr. Harris.
- 149s-150su-151f.<sup>1</sup> Freshwater Algae. A general survey based on studies in the field and laboratory. Designed for teachers and research workers who wish to acquire a practical knowledge of the algae. Problems assigned and reports required. Prerequisite: 15 credits including Course 12, or consent of instructor. Three to ten credits. TTh V, VII, VIII; 110Bot. Miss Tilden.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201-202-203. Research Problems in the Morphology of Vascular Plants. Mr. Butters.
- 205-206-207. Research Problems in the Taxonomy of Angiosperms. Mr. Rosendahl.
- 209s-210su-211f. Research Problems in Algae. Miss Tilden.
- 213-214-215. Research Problems in Embryology. Mr. Butters.

<sup>1</sup> Any of the above courses may be taken separately.

- 217s-218su-219f. Special Research Problems in the Taxonomy and Distribution of Algae. Miss Tilden.
- 221-222-223. Research Problems in Ecology. Mr. Cooper.
- 225-226-227. Research Problems in Plant Physiology. Mr. Burr, Mr. Harvey.
- 228f,w,s. Research Methods in Plant Physiology. Mr. Harvey.
- 229-230-231. Research Problems in Cytology. Mr. Rosendahl.
- 233-234-235. Seminar. Students may register for one-hour seminar credit per quarter in any of the research subjects.
- 237-238-239. Biometric Problems. Mr. Harris.
- 241s-242su-243f. Review of Phycological Literature with Reference to Selected Problems. Miss Tilden.
- 245-246-247. Botanical Problems. Mr. Harris.

### CHEMICAL ENGINEERING

Professor Charles A. Mann; Associate Professors George H. Montillon, Ralph E. Montonna.

*Prerequisites.*—Before being admitted to major work in chemical engineering, the student should have received the Bachelor's degree in chemical engineering or its equivalent. If he has not met this requirement, it will be necessary for him to pursue such additional preparatory studies as may be prescribed by the adviser.

The student selecting chemical engineering as a minor must present as prerequisites mathematics including integral calculus, physics, analytical and organic chemistry, and mechanical drawing.

*Requirements.*—For the Master's degree in chemical engineering, the major subject and the thesis must be taken in chemical engineering.

Students may not select chemical engineering in combination with any branch of chemistry as major and minor subjects except with the approval of the group committee.

The candidate for the Master's or the Doctor's degree with chemical engineering as a major must have completed, as undergraduate or graduate, a year's work in physical chemistry, such as, for example, Phys. Chem. 101s, 131f, and 132w, or their equivalent.

For the requirements for the professional degree of chemical engineer, see pages 13, 14, and 15.

*Languages.*—Candidates for the Master's degree in chemical engineering must have a reading knowledge of German or French; German is preferable in this field. For the Doctor's degree, both are required.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101s. Unit Processes. Principles and materials of construction, operation, and uses of machinery for the unit processes. Lectures and recitations. Laboratory work in operating and testing. Visits to chemical plants. Prerequisites: Anal. Chem. 1, 2, Org. Chem. 52. Four credits. MTWThF I; 225C. Mr. Mann.

- 102f. Unit Process Problems. Problems in combustion, furnaces, and kilns, the application of industrial heating and cooling devices, the study of crystallization on a commercial scale. Prerequisite: Course 101. Two credits. WF II; 325C. Mr. Montillon.
- 103w. Unit Process Problems. Problems in heat transfer, the use and design of heat exchangers, single and multiple effect evaporators, the applications of the laws of fluid flow, filtration, filter presses and centrifugals. Prerequisite: Course 101. Two credits. WF II; 325C. Mr. Montillon.
- 104s. Unit Process Problems. Problems in leaching and dissolving, counter-current extraction, gas absorption, and distillation. Drying by air, steam, and direct heat dryers. Prerequisite: Course 101. Two credits. WF II; 325C. Mr. Montillon.
- 111f-112w-113s. Design of Chemical Equipment and Plants. Laying out of plants and design of equipment based on collected data for the same. Classroom and laboratory work. Prerequisites: Courses 102, 103, 104, 131, 132. Two credits per quarter. Ar. Mr. Montillon.
- 131f. Industrial Inorganic Chemistry. Operations common to chemical industries, chemistry involved, apparatus used, marketing of products, utilization of by-products, use of trade journals. Topics: acids and alkalies, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. Prerequisite: Course 101. Four credits. MTWThF I; 111C. Mr. Mann.
- 132w. Industrial Organic Chemistry. Similar to 131 but covering organic field. Destructive distillation of coal and wood, petroleum oils, paper, unit organic processes, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. Lectures and recitations. Prerequisite: Course 101. Four credits. MTWThF I; 111C. Mr. Mann.
- 133f. Chemistry of Explosives. The history and development of modern explosives, their manufacture and uses. Lectures, required reading, and reports. Prerequisite: Course 132. Four credits. (Not offered in 1929-30.) Mr. Montonna.
- 134s. Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. Prerequisite: Course 132 or equiv. Three credits. (May be accompanied by laboratory work in 160.) Ar. Mr. Montonna.
- 136w. Chemistry and Technology of Cellulose. Discussions on processes and industries based on the use of cellulosic materials including the chemical and technological considerations. Pulp and paper, plastics, esters, artificial silks, etc. Lectures and recitations. Prerequisite: Org. Chem. 52 or equiv. Three credits. Ar. Mr. Montonna.
- 141s. Gas Manufacture and Distribution. Fundamental principles of manufacture of coal gas, carbureted water gas, and other industrial fuel gases, and the apparatus for manufacture and distribution. Open to chemists and chemical engineers. Prerequisite: Org. Chem. 52. Three credits. Ar. Mr. Montillon.

- 151f,su. Chemical Manufacture (Inorganic). Manufacture of technical products on a scale large enough to afford data for the determination of costs of manufacture. Use of semiplant scale equipment. Technical trade journals used. Laboratory. Prerequisite: Course 101. Three or more credits. Ar. Mr. Montonna.
- 152w,su. Chemical Manufacture (Organic). Similar to 151 but covering the organic field. Laboratory. Prerequisite: Course 101. Three or more credits. Ar. Mr. Montonna.
- 153f-154w-155s-156su. Special Laboratory Problems. Laboratory investigations on equipment and the manufacture of special chemical products on a large scale. Prerequisites: Courses 151, 152. Three or more credits. Ar. Mr. Montonna.
- 160s. Intermediates and Dyestuffs Laboratory. The manufacture of intermediates and dyestuffs on a large scale using semi-works equipment. Operations on sulphonation, hydroxylation, nitration, reduction, alkylation, diazotization, coupling, etc. Laboratory. Prerequisite: arranged. Three or more credits. Ar. Mr. Montonna.
- 176f-177w. Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Class and laboratory work. Prerequisite: Phys. Chem. 103. Four credits per quarter. Lect MWF I; 215C. Lab. W or Th VI-VIII; 25C. Mr. Montillon.
- 179s. Advanced Applied Electrochemistry. The more recent development in the manufacture of inorganic and organic products. Lectures and recitations. Laboratory optional. Prerequisites: Courses 176, 177. Three credits. Ar. Mr. Mann.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Seminar. Presentation and discussion of papers concerning the newer developments in chemical industries. One credit per quarter. Ar. Mr. Montillon.
- 301f-302w-303s. Research in Chemical Engineering. Unit processes, applied electrochemistry and electric furnace work, and chemical manufacture. Credits arranged. Mr. Mann, Mr. Montillon, Mr. Montonna.

#### CHEMISTRY

Professor and Director, Samuel C. Lind.

The work in the School of Chemistry is organized in six divisions or branches, namely, Inorganic, Analytical, Organic, Physical, Technological Chemistry, and Chemical Engineering. Course numbers must be preceded by the name of the division in which they occur, as Org. Chem. 151f.

In addition to the completion of the prescribed work, the candidate for a higher degree is expected to show a maturity acquired by intensive personal study of the literature and of the methods of chemistry.

*Prerequisites.*—(a) A branch of chemistry as a major subject: All candidates who choose chemistry as a major subject for the Doctor's degree must offer the following courses or their equivalent as prerequisites: at least 12 quarter credits in general inorganic chemistry and qualitative analysis, at least 10 credits in quantitative analysis, and at least one year of organic chemistry. All candidates must present at least one year of college physics and one year of college mathematics. (b) Chemistry or a branch of chemistry as a minor subject: It is not possible to state exactly those courses which will be required in each case. If the major is not chosen in one of the divisions of chemistry, the usual prerequisites will be at least 12 credits of general inorganic chemistry and qualitative analysis, and 5 credits of quantitative or 5 credits of organic chemistry.

Students may not select two branches of chemistry as major and minor subjects except with the approval of the graduate faculty in the School of Chemistry.

The choice of the particular courses to be presented in fulfilment of a minor will be made after consultation with the student's adviser. Either Analytical Chemistry, Courses 101-102 or Organic Chemistry, Courses 151-152-153 will be acceptable as a minor for the Master's degree, or for not more than one half of a minor for the Doctor's degree, if the student is not taking major work in chemistry.

*Language requirements.*—Candidates for the Master's degree must have a reading knowledge of German or French; German is preferred. For the Doctor's degree, both are required.

### CHEMISTRY, ANALYTICAL

Professor Izaak M. Kolthoff; Associate Professor Isaac W. Geiger; Assistant Professor Landon A. Sarver.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101w, 102s. Quantitative Analysis. General principles, methods, and procedure both gravimetric and volumetric. Typical problems; laboratory practice. Prerequisite: Inorg. Chem. 13. Five credits per quarter. Lect. M VI; 325C. Rec. F VI; 315C. Lab. W VI-IX; MF VII-IX; 310C. Mr. Geiger.
- 123f-124w-125s. Advanced Analytical Chemistry. A systematic survey by general lectures with typical procedures selected for laboratory practice. Drill in application of modern chemical theory to analytical problems. Sanitary analysis of water is included in spring quarter. One lecture, seven laboratory hours per week. Prerequisites: Courses 101 and 102 or 7. Three credits. Lect. T VI; 315C. Lab. T VII-IX; Th VI-IX; 310C. Mr. Sarver.
- 127f-128w-129s. Analytical Chemistry of the Rare Elements. A survey of the quantitative methods for the estimation of the rare elements other than the rare earths. Analyses of commercially important alloys, ores, and compounds. One lecture and seven laboratory hours per week.

Prerequisite: Anal. Chem. 101, 102. Three credits per quarter. Mr. Geiger.

131f. Applications of Indicators in Neutralization Reactions and of  $p_H$  Determinations. Three credits. Prerequisites: Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Kolthoff.

132w-133s. Electrometric Measurements and Titrations. The application of potentiometric and conductometric methods in analytical work. Three credits. Prerequisites: Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Kolthoff.

134f,w,s. Seminar: Modern Problems in Analytical Chemistry. One credit. Prerequisites: Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Kolthoff.

#### COURSE PRIMARILY FOR GRADUATE STUDENTS

301f-302w-303s. Research in Quantitative Analysis. Credits arranged. Mr. Kolthoff, Mr. Geiger, Mr. Sarver.

### CHEMISTRY, INORGANIC

Professor M. Cannon Sneed; Associate Professors Lillian Cohen, Lloyd H. Reyerson; Assistant Professor Henry N. Stephens.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101s. History of Chemistry. The theories of chemistry from the period of the ancients, with particular emphasis on modern theories and laws. Prerequisite: Org. Chem. 52. Two credits. Miss Cohen.

102w. Advanced Qualitative Analysis. Includes an analysis of minerals, alloys, paints, and the methods of detecting some of the rarer elements. Prerequisites: Anal. Chem. 1 and 2. Two or three credits. Mr. Sneed.

103f-104w-105s. Advanced Inorganic Chemistry. A 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. Prerequisites: Anal. Chem. 1 and 2, Org. Chem. 52. Three credits per quarter. Lect. MWF IV; 111C. Mr. Sneed.

106f-107w-108s. Chemistry of the Rare Elements. History, occurrence, preparation, and properties of the less usual elements. Classification, valence, and atomic structure of these elements as related to the natural system of the chemical elements. Preparation and properties of their compounds. Use of the microscope and the spectroscope in following the course of the purification. Prerequisite: Anal. Chem. 1 or 2 or by permission. Three credits.

#### COURSE PRIMARILY FOR GRADUATE STUDENTS

301f-302w-303s. Research Work in Inorganic Chemistry. Credits arranged. Mr. Sneed, Mr. Reyerson.

### CHEMISTRY, ORGANIC

Professor William H. Hunter; Associate Professor Lee I. Smith; Assistant Professors Walter M. Lauer, Henry N. Stephens.



## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w-103s. Advanced Organic Chemistry. An introduction to the literature of organic chemistry. Structure, reaction mechanism, and relation of physical properties to constitution. May be accompanied by appropriate laboratory work in Course 139. Prerequisite: Course 53. Three credits per quarter. TThS III; 315C. Mr. Hunter.
- 111f. Reagents in Organic Chemistry. A discussion of typical reagents used in organic reactions: their limits of applicability, methods of use, and types of substances with which they react. May be accompanied by appropriate laboratory work in Course 137. Prerequisite: Course 53. Three credits. MWF II; 325C. Mr. Smith.
- 113s. The Aliphatic Compounds. An advanced descriptive course, with special emphasis upon the compounds having more than one functional group. May be accompanied by appropriate laboratory work in Organic Chemistry 139. Prerequisite: Course 153. Three credits. MWF II; 315C. Mr. Smith.
- 115s. The Heterocyclic Compounds. A discussion of the nomenclature, preparation, properties, and uses of the typical heterocyclic systems. May be accompanied by appropriate laboratory work in Course 139. Prerequisite: Course 53. Three credits. (Not offered in 1929-30.) Mr. Smith.
- 116f. The Terpenes. The terpenes and their oxygen derivatives. The constituents of essential oils. The constitution of the rubber hydrocarbon with the important theories of oxidation and of vulcanization. Prerequisite: Course 153. Three credits. Mr. Stephens.
- 122w. The Aromatic Compounds. The chemistry of the aromatic compounds with special reference to dye intermediates and synthetic drugs. Prerequisite: Course 53. Three credits. Mr. Lauer.
- 123s. Dyes. A study of the important classes of dyes from the viewpoint of the organic chemist. Prerequisite: Course 153. Three credits. Mr. Lauer.
- 137f,w,s. Advanced Organic Chemistry Laboratory. Difficult preparations and problems. It is intended primarily to supplement the student's knowledge of the methods of organic chemistry. Prerequisite: Course 153. Two to five credits. Laboratory arranged. 390C. Mr. Lauer.
- 139f,w,s. Advanced Organic Chemistry Laboratory. Selected laboratory problems of an advanced nature, including some original work. An introduction to research work. These advanced laboratory courses may be taken under any member of the Division of Organic Chemistry. Students may also register for this course who desire appropriate laboratory work for other advanced courses. Prerequisite: Course 153. Two to five credits. Mr. Hunter.
- 151f-152w-153s. Organic Chemistry. An introduction to the chemistry of carbon compounds. The laboratory work will include the preparation of characteristic substances. Not offered to students taking major work in chemistry. See *introductory statement*. Prerequisite: fifteen credits in chemistry. Five credits per quarter. Lect. MWF III; 325C. Rec. Th III; Lab. TTh VI-VIII; 390C. Mr. Hunter.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Organic Chemistry Seminar. One hour per week. One credit. Open only to students taking research in organic chemistry. Mr. Hunter.
- 301f-302w-303s. Research in Organic Chemistry. Credits arranged. Mr. Hunter, Mr. Smith, Mr. Lauer, Mr. Stephens.

## CHEMISTRY, PHYSICAL

Professors Samuel C. Lind, Frank H. MacDougall; Associate Professor Lloyd H. Reyerson; Assistant Professor Nelson W. Taylor.<sup>1</sup>

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w-103s. Physical Chemistry. A general survey of the subject. Three lectures and one recitation. Laboratory work three or six hours per week. Prerequisites: two years college chemistry, one year college physics. Three, four, or five credits, depending on the amount of laboratory work. Lect. MWF IV; 325C. Rec. S IV; 115C. Lab. WF VI-VIII; 15C, 117C. Mr. MacDougall.
- 110f-w. Physical Chemistry. Designed chiefly for medical and biological students. Prerequisite: Org. Chem. 2. Four credits. Mr. Taylor.
- 116f-117w-118s. Advanced Physical Chemistry. Three lectures and one recitation. Laboratory work for one three-hour period may be taken if desired. Prerequisites: Course 103 and calculus. Three credits per quarter, or four with laboratory. Mr. Taylor.
- 129s. Principles of Colloidal Chemistry. Prerequisites: Course 103 and calculus. Two credits. (Not offered in 1929-30.) Mr. Reyerson.
- 130s. Applications of Colloidal Chemistry. Prerequisite: Course 103. Two credits. Mr. Reyerson.
- 131f-132w-133s. Colloid Chemistry Laboratory. Credits and hours arranged. Must be preceded or accompanied by Course 129 or 130. Mr. Reyerson.
- 144s. Magnetochemistry. A course in atomic structure dealing specially with the magnetic properties of substances. Lectures, discussions, reports. Prerequisite: Course 103. Three credits. Mr. Taylor.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. Prerequisites: Course 103 and calculus. Four credits per quarter. Mr. MacDougall.
- 204f-205w-206s. Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure, structure of atom, quantum theory. Prerequisites: Course 103 and calculus. Four credits per quarter. (Not offered in 1929-30.) Mr. MacDougall.
- 211f-212w-213s. Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Prerequisite: Course 103. Credits arranged. Mr. MacDougall.

<sup>1</sup> Absent on leave, 1929-30.

251f-252w-253s. Physical Chemistry Seminar. One hour a week. For students taking advanced courses in physical chemistry. One credit. Mr. MacDougall, Mr. Reyerson, Mr. Taylor.

#### PHOTO AND RADIO CHEMISTRY

161f-162w-163s. Radioactivity. Discovery; theory of atomic disintegration; properties, transformations, and preparation of radioactive elements; properties and effects of alpha, beta, and gamma rays; radioactive and non-radioactive isotopes. Prerequisite: Phys. Chem. 103. Two credits per quarter. Mr. Lind.

164f,w,s. Radioactivity Laboratory. Use and standardization of electroscopes, radioactive measurements, and quantitative determination of radium in ores, minerals, waters, and plant products. One or two credits. Must be preceded or accompanied by Radioactivity 161. Mr. Lind.

175s. Photochemistry. History, development, and present status of photochemistry. Prerequisite: optics and Phys. Chem. 103. Three credits. Mr. Lind.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

271f-272w-273s. Chemical Activation. (Seminar 1 hour per week for graduate students). The current theories of chemical activation, including photochemical excitation, gaseous ionization, and the kinetics of cluster and of chain reactions. Prerequisites: physics and physical chemistry. One credit per quarter. Mr. Lind.

301f-302w-303s. Research in Physical Chemistry, including work in electrochemistry, photo and radio chemistry, and colloids. Credits arranged. Mr. Lind, Mr. MacDougall, Mr. Reyerson, Mr. Taylor.

#### CHEMISTRY, TECHNOLOGICAL

Associate Professor Everhart P. Harding.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f-101w-102s. Food Analysis. Prerequisite: Course 21. Three credits per quarter. Lect. T IV; 215C. Lab. F II-III, VI-IX; 217C. Mr. Harding.

103w. Exact Gas Analysis. Prerequisite: Anal. Chem. One or two credits. Mr. Harding.

104s. Microchemistry. The precipitation, examination, and identification of minute quantities of substances and the examination of food materials, fibers, etc., by means of the microscope. Prerequisite: Course 21. One or two credits. Mr. Harding.

105f. Gas and Fuel Analysis. The chemical analysis and colorimetry of solid and gaseous fuels and methods of testing municipal gas. Prerequisite: Anal. Chem. 1. Three credits. Lect. S I; 215C. Lab. TTh I-III; 10C, or Th VI-VIII, S II-IV; 10C. Mr. Harding.

106w. Petroleum and Petroleum Products. Examination and testing principally of gasoline, illuminating and lubricating oils. Prerequisite:

- Anal. Chem. 1. Three credits. Lect. S I; 111C. Lab. TTh I-III: 10C. or Th VI-VIII; S II-IV; 10C. Mr. Harding.
- 107f,w,s. General Technical Analysis. Includes a large range of topics; textiles and paper, paints and varnishes, asphalt and tars, boiler waters, soaps, edible oils and fats, and various other food materials and food products. Prerequisite: Anal. Chem. 1. One, two, or three credits. Lect. Th II; 215C. Lab. TS I-III; 217C. Mr. Harding.

## COURSE PRIMARILY FOR GRADUATE STUDENTS

- 361f-362w-363s. Research in Technological Chemistry. Credits arranged. Mr. Harding.

## CHILD WELFARE

Professor John E. Anderson; Associate Professors Josephine C. Foster, Florence L. Goodenough, Esther McGinnis; Assistant Professor Edith Boyd.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 120s. Health Care of the Young Child. Physical care, illnesses, prevention of disease, and health problems of the young child, primarily for nursery school teachers and those in charge of groups of children and for parental education workers. Two credits. Sr., grad. by permission of instructor; TTh V; 202OLa. Dr. Boyd.
- 130s. The Development of the Young Child. An advanced course dealing with the development of the pre-school child from the anatomical, physiological, psychological, educational, and social aspects. Lectures, readings in the experimental literature, and reports. Prerequisite: 12 credits in psychology or equivalent, and permission of instructor. Three credits. Sr., grad.; TThS I; 202OLa. Mr. Anderson.
- 133f-134w-135s. Observational and Experimental Methods in the Study of the Development of the Young Child. The various methods and techniques such as growth records, mental tests, ratings, controlled observations, etc., used in the experimental study of the young child. Practical exercises and problems on institute records and data will be given. Prerequisite: 10 credits in psychology or educational psychology, including one laboratory course, or the equivalent, and permission of instructor. Six to nine credits. Sr., grad.; M VI; WF VI-VII; 202OLa. Miss Goodenough.
- 170f. Parental Education in Child Care and Training. A consideration of the content and methods used in courses and study groups for parents in the care and training of young children. Lectures, discussions, and reports. Prerequisite: 15 credits in education, or psychology or sociology, or preventive medicine. Three credits. Sr., grad.; MWF IV; 110P. Miss McGinnis.
- 173w-174s. Technique and Practice of Parental Education. Field work in the technique of organizing and conducting parental study groups and courses for the study of the young child. Prerequisite: CW.I. 170 and permission of instructor. Six credits. Sr., grad.; hours ar; 202OLa. Miss McGinnis.

190w-191s. Mental Examination of Pre-School Children. A study of the methods used in testing young children together with practice in such testing. Prerequisite: Ed. Psy. 143-144-145 or 134-135-136, or equivalent, and permission of instructor. Two or four credits. Sr., grad.; TTh II; 202OLa. Miss Goodenough.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 230-231-232. Seminar in the Development of the Young Child. Reviews of current literature, discussion of fundamental problems, and reports on research. Meetings in alternate weeks. Attendance of graduate students who are candidates for degrees is required. Three credits. Graduate students only; permission of instructor; hours arranged; 202OLa. Mr. Anderson.
- 233-234-235. Research in the Development of the Young Child. Credits arranged. Graduate students only. Mr. Anderson, Miss Goodenough.
- 250-251-252. Seminar in Nursery School Education. Reviews and interpretations of current literature, discussion of fundamental problems and theory, problems of administration and organization. Three credits. Graduate students only; permission of instructor; hours arranged; 202OLa. Mrs. Foster.

#### CIVIL ENGINEERING

Professors Frederic H. Bass, Alvin S. Cutler, Frederick M. Mann, John I. Parcel; Associate Professor Fred C. Lang.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 161f. Hydrology. Rainfall, evaporation, transpiration, percolation, run-off. Flood and low water flows of streams. Storage problems. Three credits. Mr. Bass.
- 162w. Water Supply Engineering. Sources of supply. Laboratory methods of testing water; wells, surface water intakes, conduits and pipe lines, distribution systems, and purification plants. Selection of pumping machinery and motive power. Prerequisite: M.&M. 129. Three credits. Mr. Bass.
- 163s. Sanitary Engineering. Quantities of sewage and storm water; precipitation and run-off. Sanitary sewer system for a small community; storm water system for a city district. Stream pollution and sewage disposal. Prerequisite: C.E. 162. Three credits. Mr. Bass.
- 164w-165s. Water Power. Types of low, medium, and high head developments. Details of developments. Types of dams. Turbine settings and characteristics. Prerequisite: M.&M. 129. Three credits. Mr. Bass.
- 171f. Building Sanitation. The location and orientation of buildings; lighting, ventilation, water supply, plumbing, sewage, and refuse disposal. Two credits. Mr. Bass.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 261s. Water and Sewage Purification. Continuation of Course 163. Design of water purification and sewage disposal. Prerequisite: C.E. 162. Three to five credits. Mr. Bass.
262. Water Supply Problems. Continuation of Course 162. Three to five credits. Mr. Bass.
272. City Planning. The physical elements of the city; typography, drainage, geology. Public works and structures. Street arrangements; rapid transit; railroad terminals. City districting. Subsurface structures. Esthetic features of the city; the civic center; parks; boulevards; public buildings. Prerequisite: C.E. 52. Three to five credits. Mr. Bass, Mr. Mann.
- 280f-281w-282s. Civil Engineering Research. Original work along lines of plain and reinforced concrete, structural steel, hydraulics, municipal and transportation problems. Investigations, reports, tests, designs. Five credits per quarter. Mr. Bass, Mr. Cutler, Mr. Parcel, Mr. Lang.

## RAILWAY ENGINEERING

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 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. Prerequisite: Course 23. Three credits. Mr. Cutler.
- 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. Signalling and interlocking. Prerequisite: Course 23. Three credits. 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. Prerequisite: Course 23. Three credits. 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. Prerequisite: Course 121. Three credits. 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. Rapid transit, motor transport. Prerequisite: Course 122. Three credits. Mr. Cutler.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 221f-222w-223s. Railway Administration. Analysis of railway organization and methods of management and operation. Principles of valuation and rate making. Prerequisite: Course 122. Three credits per quarter. Mr. Cutler.
- 224f. Railway Terminals and Yards. Continuation of Course 123. Prerequisite: Course 122. Three credits. Mr. Cutler.

## STRUCTURAL ENGINEERING

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- C.E.131w. Bridge Analysis. Stresses in simple span railway bridge trusses of the larger type. Baltimore, Pettit, Whipple, and "K" trusses. Cantilevers, continuous and swing bridges. Prerequisite: C.E. 33. Three credits. Mr. Parcel.
- C.E.132s. Bridge Design. Design and detail drawing of simple span railway truss bridge. Designing office practice. Prerequisite: C.E. 131. Three credits. Mr. Parcel.
- C.E.134f. Statically Indeterminate Structures. General theory of deflections and of statically indeterminate stresses and application to continuous girders, rigid frames, continuous and swing bridges, arches and structures with redundant supports or members. Prerequisites: C.E. 132, 142. Three credits. Mr. Parcel.
- C.E.135s. Reinforced Concrete Design. Structural layout of various types of buildings. Rigid frame analysis applied to reinforced concrete buildings. Prerequisite: C.E. 33. Four credits. Mr. Wise.
- C.E.141f. Reinforced Concrete. Principles of reinforced concrete. Theory of beams, slabs, and columns and the application to ordinary structures. Prerequisite: M.&M. 128. Three credits. Mr. Wise.
- C.E.141(a)f. Reinforced Concrete. Similar to 141, with problems of special interest to students in architectural engineering. Prerequisite: M.&M. 128. Three credits. Mr. Wise.
- C.E.142w. Reinforced Concrete Design. Continuation of 141, with special emphasis on the applications to design of buildings, bridges, retaining walls, etc. Prerequisite: C.E. 141. Three credits. Mr. Wise.
- C.E.142(a)w. Reinforced Concrete Design. Similar to 142 with problems of special interest to students in architectural engineering. Prerequisite: C.E. 141. Three credits. Mr. Wise.
- C.E.143s. Reinforced Concrete Arch. Theory and design of reinforced concrete arch bridges. Prerequisite: C.E. 142. Three credits. Mr. Wise.
- C.E.144f. Reinforced Concrete. (For mechanical, electrical, or agricultural engineers.) Design of reinforced concrete beams, girders, and columns. Design of footings and foundations. Design of retaining walls. Form work. Mixing and placing concrete. Testing and inspection of concrete work. Prerequisites: M.&M. 84 and 85 or 127 and 128. Three credits. Mr. Hughes.

- C.E.146f,w,s. Concrete Laboratory. Theory and practice of designing, making and testing concrete mixes. Making of specimens in laboratory. Testing of specimens. Properties of plain concrete. Prerequisite: M.&M. 141. Three credits. Mr. Hughes.
- C.E.147w. Foundations. Foundations of bridges and buildings. Earth pressure theory. Pile foundations. Cofferdams, caissons and deep foundations. Bridge piers and abutments. Prerequisite: C.E. 33. Three credits. Mr. Wise.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- C.E.234f-235w-236s. Advanced Structural Design. Application of fundamental theory of stresses. Impact and fatigue. Relative economy in design. Comparative study of specifications. Design of long span and movable bridges, suspension bridges and arches. Prerequisites: Courses 132, 142. Three credits per quarter. Mr. Parcel.
- C.E.237f-238w-239s. Structural Laboratory. Experimental problems in structural steel or concrete. Strain gauge study of stresses in structural members, and connections. Prerequisites: Courses 132, 142. Three to five credits per quarter. Mr. Hughes.
- C.E.245f-246w-247s. Advanced Reinforced Concrete Analysis. Flat plate theory and application to reinforced concrete structures. Shrinkage and temperature stresses. Local stresses. Design of tanks, towers, and chimneys. Review of literature of reinforced concrete. Prerequisites: Courses 134, 142. Three to five credits per quarter. Mr. Wise.

COMPARATIVE LITERATURE<sup>1</sup>

Professor Oscar W. Firkins.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101-102-103.† Drama. An outline of the history of drama, including the drama of today. Lectures and readings. TThS III; 113F. Mr. Firkins.
- 105-106-107.‡ Principles of Criticism. Lectures and readings. MWF VI; 113F. Mr. Firkins.
110. The International Romantic Movement in Europe (1775-1825). TThS II; 113F. Mr. Firkins.

## COURSE PRIMARILY FOR GRADUATE STUDENTS

203. The Arthurian Legend: from Geoffrey of Monmouth to Tennyson and Wagner. Mr. Firkins.
206. French and English Literary Criticism: from the sixteenth century to the present time. Mr. Firkins.

## COMPARATIVE PHILOLOGY

Professors Frederick Klaeber,<sup>2</sup> Samuel Kroesch.

*Prerequisites.*—This department, besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies

<sup>1</sup> Prerequisites for graduate work same as English language and literature.

<sup>2</sup> Absent on leave, 1929-30.



in comparative Indo-European philology, and more particularly the investigation of Old Germanic dialects. Related courses in English philology will be found under English Language and Literature.

As a matter of course, candidates for the Master's degree must have a knowledge of Latin and German; candidates for the Doctor's degree must have a knowledge of Greek also.

Students are advised to confer with the department before selecting courses.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w. General Introduction to the Science of Language. Prerequisite, one of the following groups: (1) five years' foreign language, four may be in high school and one in college; (2) two years' foreign language. Six credits. IV; 205F. Mr. Klaeber.
- 103f. Universal Language. Comparison of families of languages, grammatically and lexically. Movement for creation of an international language. Prerequisites same as for Course 101. Three credits. TS IV; 205F. Mr. Klaeber.
- 105s. The Life of Words. Etymology, and semasiology. Growth of vocabulary; change of words in form and meaning. Prerequisites same as for Course 101. Three credits. TTh VI; 205F. Mr. Klaeber.
- 108s. Comparative Phonetics. A study of speech sounds and the nature of their production with especial reference to English, French, and German. Open to students of the modern languages. Prerequisites: two credits in other than elementary courses. This course is identical with German 108. Three credits. Hours arranged. Mr. Kroesch.
- 109f-110w-111s. History of the German Language. Identical with German 109-110-111. Nine credits. Hours arranged. Mr. Klaeber.
- 141f-142w-143s. Historical Grammar of the English Language. I. Sounds and spelling. II. Accidence and syntax. Nine credits. Hours arranged. Mr. Klaeber.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

201. Comparative Grammar of the Greek, Latin, and Germanic Languages. A general survey of the field of Indo-Germanic philology will be included.
- 202-203. Gothic. The relation of Gothic to other Germanic dialects will be particularly emphasized. Study of the grammar, reading of texts, discussion of problems. Mr. Klaeber.
205. Urgermanische Grammatik. Lectures and study of standard works. Mr. Klaeber.
- 206-207-208. Old Saxon. Old Saxon grammar; interpretation of the *Heliand* and *Genesis*. Mr. Klaeber.
- 209-210-211. Old High German. Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch*. This course is identical with German 209-210. Mr. Klaeber.
- 212-213. Research Seminar. Competent graduate students will be advised and assisted in research along special lines. Mr. Klaeber.

## DAIRY HUSBANDRY

Professors Clarence H. Eckles, Willis B. Combs; Assistant Professors Harold Macy, William E. Petersen.

Students taking their major in dairy husbandry may be exempted from the language requirements for the Master's degree.

Students desiring major work in dairy production should make arrangements with the Division of Dairy Husbandry previous to registration.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f. Milk Production. Problems of the dairy farmer. Five credits. MTWFS IV; 210HH. Mr. Eckles.
- 102s. Market Milk. Lectures and laboratory work. Three credits. MW IV; Th VI, VII, VIII; 210HH. Mr. Macy.
- 103w. Dairy Stock Feeding. Application of the principles of nutrition to special problems of feeding the dairy cow and growing the young animals. Three credits. MWF III; 210HH. Mr. Eckles.
- 104s. Dairy Stock Selection. Practice in comparative judging; selection and valuation; visits to pure-bred herds. Three credits. MW VI, VII, VIII; F VI; 210HH. Mr. Petersen.
- 105f-106w-107s. Seminar. Special investigations and study of selected topics. Reports on assigned subjects and reviews of recent scientific investigations. Three credits. S II; 214HH. Mr. Eckles.
- 110w. Dairy Products III. Similar to Course 111f with special application to ice cream. Three credits. TS IV; T VI, VII, VIII; 210HH. Mr. Combs.
- 111f. Dairy Products I. The chemical, bacteriological, and economic problems in the manufacture and marketing of butter. Three credits. MW VI; F VI, VII, VIII; 210HH. Mr. Combs.
- 112s. Dairy Products II. Similar to Course 111f with special application to cheese, condensed and powdered milk. Three credits. TS IV; T VI, VII, VIII; 210HH. Mr. Combs.
- 113s. Technical Control. Chemical and bacteriological laboratory methods used in technical control of milk and its products. Three credits. TTh I, II, III; 102HH. Mr. Combs, Mr. Macy.
- 115su. Problems in Dairy Husbandry. A study of special problems in dairy husbandry. Open only to the teacher of agriculture and the extension worker. (See Summer Session bulletin.) 210HH. Mr. Petersen.
- 115s. Advanced Dairy Bacteriology. Investigations of specific problems in the bacteriology of milk and dairy products. Prerequisites: D.H. 2 or equiv., D.H. 111 or 112; ar. Mr. Macy.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201w. Dairy Bacteriology. Lectures, assignments, laboratory work. Types of milk organisms, relation of the bacteria of milk to dairy manufacturers and to public health, the bacteriology of dairy products. MWF VI, VII, VIII; 210HH. Mr. Macy.

202f-203w-204s-208su-210su. Research in Dairy Husbandry. Facilities offered for study and investigation of subjects pertaining to dairy cattle. Students are allowed to assist at times with investigations under way in the experiment station. Arranged to meet the needs of the individual student. Open in the Summer Session only to those who have had preliminary graduate work. Mr. Eckles.

205f-206w-207s-209su-211su. Dairy Products. Opportunity and facilities are offered for study and investigation of problems concerning dairy products. The work is arranged to meet the needs of the individual student. Open in the Summer Session only to those who have had preliminary graduate work. Mr. Combs.

### ECONOMICS

Professors Russell A. Stevenson, Roy G. Blakey, Andrew Boss, Frederic B. Garver, Alvin H. Hansen, Oscar B. Jesness, Bruce D. Mudgett, J. Warren Stehman, Roland S. Vaile; Associate Professors Ernest A. Heilman, Arthur W. Marget, George A. Pond, Clare L. Rotzel, Frederick C. Wagner; Assistant Professors Rex W. Cox, Lewis F. Garey, Dorothea Kittredge, Walter R. Myers, Harry J. Ostlund, John J. Reighard, William H. Stead, Robert M. Weidenhammer.

Candidates for higher degrees will be accepted as majors in economics in the following fields: money and banking, public finance, economic theory, economic history, labor statistics, farm management and agricultural economics (marketing, land economics, farm finance, economics of agricultural production, agricultural prices); in accounting, only for the Master's degree.

### GENERAL ECONOMICS AND BUSINESS ADMINISTRATION

*Prerequisites.*—For major work, 27 quarter credits for those offering Economics 1-2 and 3, or their equivalent; 18 quarter credits for those not presenting one of these courses or an equivalent. These credits should include Money and Banking, Statistics, and Accounting. Candidates not presenting these fundamental courses upon registration in the Graduate School may be required to complete them in addition to the regular course requirements for the degree.

*Majors and minors.*—Major and minor work for the Master's degree may both be taken in economics if the candidate presents a program of courses properly complementing each other and not too closely related, if approved by the Executive Committee of the Graduate School. Agricultural economics, economic history, and accounting will usually be considered satisfactory as majors or minors distinct from general economics.

*Required courses.*—All candidates for advanced degrees must complete Economics 103-104, or Economics 203-204, or the equivalent of either. Other courses will be required according to the field in which the candidate is working. Ordinarily at least one full graduate seminar must be carried throughout the year.

*Language requirement.*—Candidates for the Master's degree in economics are required to have a reading knowledge of a foreign language only when the thesis is written in the following fields: money and banking, public finance, economic theory, economic history, and labor.

### FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

*Prerequisites.*—For major work 18 quarter credits. If, however, these credits do not include courses in Money and Banking, Statistics, and Accounting, courses in these fields may be required in addition to the regular course requirements for the degree.

*Majors and minors.*—Upon approval of the graduate faculty, candidates doing their graduate work in farm management and agricultural economics may take their minor in general economics.

*Language requirement.*—Candidates for the Master's degree in farm management and agricultural economics are not required to have a reading knowledge of a foreign language.

### GENERAL ECONOMICS

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

NOTE.—The following courses in other departments carry credit also in Economics: History 113-114-115, Economic History of Europe since 1750; 116-117-118, Economic History of Europe, 1300-1750; 169, Economic History of the United States since 1865; 210-211-212, Graduate Seminar in Economic History. Political Science 105, Colonization; 157, Recent Social Legislation; 158, Government and Business; 159, Law of Public Utilities.

#### BUSINESS ADMINISTRATION

- 101f-102w. Advanced General Economics. Six credits. (1) TThS II; 209B. (2) MWF III; 202B. Mr. Garver.
- 101w-102s. Advanced General Economics. Six credits. TThS I; 109B. Mr. Garver.
- 107f. Advanced General Economics. Combined course. Five credits. MTWThF II; 202B. Mr. Garver.
- 109f,w,s. Business Policy. Three credits. Fall, MWF VII, 202B; winter, MWF VII, 109B; spring, MWF II, 6B. Mr. Stevenson.
- 112f,w,s. Business Statistics. Three credits. Fall, MWF II, 102B; winter, MWF, II, 102B; spring, MWF II, 102B. Mr. Stevenson.
- 130f,s. Cost Accounting. General Survey. Three credits. Fall, TThS I, 303B; spring, TThS I, 303B. Mr. Ostlund.
- 131f-132w. Cost Accounting. Six credits. TThS II; 301B. Mr. Ostlund.
- 133s. Cost Accounting Systems. Three credits. TThS II; 302B. Mr. Ostlund.
- 134f. Income Tax Accounting. Three credits. MWF I; 302B. Mr. Reighard.
- 135f-136s. Auditing. Six credits. MWF III; 302B. Mr. Reighard.

- 137f-138w. Accounting Practice and Procedure. Six credits. MWF IV; 303B. Mr. Heilman.
- 139f,w,s. Advanced General Accounting. Three credits. MWF III; 303B. Mr. Heilman.
- 145s. Foreign Exchange. Three credits. MWF IV; 109B. Mr. Myers.
- 146w. Investments. Three credits. MWF VI; 102B. Mr. Weidenhammer.
- 147s. Bank Administration. Three credits. MWF I; 104B. Mr. Marget.
- 148s. The Securities Market. Three credits. TThS II; 104B. Mr. Weidenhammer.
- 150s. Advanced Farm Finance. Three credits. W VI, VII; 104B. Mr. Myers.
- 152s. Real Estate Valuation and Land Utilization. Three credits. TThS III; 109B.
153. Real Estate Management and Practice. Three credits. Ar.
- 155f,w,s. Corporation Finance. Three credits. Fall, MWF III, 102B; winter, MWF III, 102B; spring, Lect. F III, 202B; (1) MW II, 209B; (2) MW III, 202B. Mr. Stehman.
- 156f. Finance Management. Three credits. TThS I; 102B. Mr. Stehman.
- 165f,w. The Economics of Public Utilities. Three credits. TThS III; fall, 202B; winter, 102B. Mr. Garver.
- 167w. Personnel Administration. Three credits. TThS I; 202B. Mr. Stead.
- 168s. Advanced Personnel Administration. Three credits. TThS I; 209B. Mr. Stead.
- 177w. Foreign Trade. Three credits. MWF I; 202B. Mr. Blakey.
- 180f-181w-182s. Seminars for Seniors and Graduates. Intensive study of problems in respective fields of specialization. In 1929-30 they will be offered as follows:

No.	Title	Credits	Day	Hour	Bldg.	Instructor
A.	Accounting <sup>1</sup>	6	TThS	II	302B	Mr. Reighard
B.	Business Finance	6	T	VII-VIII	109B	Mr. Stehman and others
C.	Marketing	9	TTh	VI-VII½	104B	Mr. Vaile and others
D.	Personnel	9	Ar	Ar	Ar	Mr. Stead
E.	Secretarial Practice <sup>2</sup>	6	MWF	IV	1B	Mr. Ostlund and others
F.	Statistics	9	Ar	Ar	Ar	Mr. Mudgett
G.	Production Management <sup>2</sup>	6	Ar	Ar	Ar	
H.	Insurance <sup>3</sup>	3	Ar	Ar	Ar	

- 194f-195w-196s. Advanced Advertising Procedure. Three credits. F IV; 104B. Mr. Vaile.

## ECONOMICS

- 103f-104w. Value and Distribution. Six credits. MWF II; 6B. Mr. Garver.
- 105s. History of Economic Ideas: The Classical Economists. Three credits. (Offered in alternate years; not offered in 1929-30.) Mr. Garver.

<sup>1</sup> Winter and spring only.

<sup>2</sup> Fall and winter only.

<sup>3</sup> Spring only.

- 106s. History of Economic Ideas: The Critics of the Classical Economists. Three credits. MWF VII; 102B. (Offered in alternate years.) Mr. Hansen.
- 108w. Marketing Organization: Agricultural Products. Three credits. MWF VIII; 109B.
- 113w-114s. Theory of Statistics. Six credits. MWF I; 102B. Mr. Mudgett.
- 124f. Comparative Banking—British Systems. Three credits. MWF III; 104B. Mr. Myers.
- 125w. Comparative Banking—European Systems. Three credits. MWF III; 104B. Mr. Myers.
- 127s. Comparative Banking—South American Systems. Three credits. MWF II; 104B. Mr. Myers.
- 141f,w,s. Monetary and Banking Policy. Three credits. Fall (1) MWF I, 102B; (2) TThS III, 209B; (3) MWF IV, 209B; (4) MWF VI, 209B. Winter, (1) MWF I, 209B; (2) TThS II, 6B; (3) MWF IV, 209B. Spring, (1) MWF III, 209B; (2) MWF VII, 209B. Mr. Marget.
- 149f,w,s. Business Cycles. Three credits. Fall, MWF VIII, 202B, Mr. Myers. Winter, (1) MWF I, 109B, Mr. Marget; (2) MWF VIII, 102B, Mr. Myers. Spring, MWF III, 102B, Mr. Myers.
- 154s. Public Utilities. Three credits. TThS III; 102B. Mr. Garver.
- 160w. The Modern Corporation. Three credits. MWF IV; 102B. Mr. Stehman.
- 161f,w,s. Labor Problems and Trade Unionism. Three credits. Fall, MWF IV; 202B. Winter and spring, TThS III; 202B. Mr. Hansen.
- 162w. Labor Movements. Three credits. MWF IV; 202B. Mr. Hansen.
- 163s. Economic Aspects of Population and Immigration. MWF IV; 202B. Mr. Hansen.
- 164s. Labor Legislation and Social Insurance. Three credits. TThS III; 209B. Mr. Stead.
- 166w. Contemporary Economic Problems. Three credits. MWF VII; 102B. Mr. Hansen.
- 172f. Economics of Transportation. Three credits. MWF VIII.
- 176f,s. Commercial Policies. Three credits. MWF I; 202B. Mr. Blakey.
- 191f-192w. Public Finance. Three credits. MWF III; 209B. Mr. Blakey.
- 193s. State and Local Taxation. Three credits. MWF III; 104B. Mr. Blakey.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 203f-204w. Seminar in Economic Theory. Six credits. MW VIII½-IX; 104B. Mr. Garver.
- 206s. Seminar in Market Prices. Three credits. MW VII-VIII½; 104B. Mr. Vaile.
- 210f-211w-212s. Seminar in Labor. Ar. Mr. Hansen.
- 243f-244w-245s. Seminar in Money and Banking. Six credits. TF VIII; 104B. Mr. Marget.

## FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

*Prerequisites.*—For major work 18 quarter credits. If, however, these credits do not include courses in Money and Banking, Statistics, and Accounting, courses in these fields may be required in addition to the regular course requirements for the degree.

*Majors and minors.*—Upon approval of the graduate faculty, candidates doing their graduate work in farm management and agricultural economics may take their minor in general economics.

*Language requirement.*—Candidates for the Master's degree in farm management and agricultural economics are not required to have a reading knowledge of a foreign language.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 102f,w. Farm Management: Organization. The business side of farming with emphasis on farm organization and equipment. Prerequisites: Course 2 and Agron. 1. Three credits. Fall, MW II and T VI, VII or F II, III; 302HH. Winter, MW I and Th VII, VIII or MW II; 311HH. Mr. Garey.
- 103w,s. Farm Management: Operation. A continuation of 102 with special attention to farm operation. Prerequisite: Course 102. Three credits. Winter, MW II and T VI, VII. Spring, MW I and Th VII, VIII; 302HH. Mr. Garey.
- 104s. Types of Farming. A study of types of farming and of prevailing farm practices in the principal agricultural production areas. Prerequisites: Courses 102, 103, or equiv. Three credits. MWF II; 311HH. Mr. Boss.
- 110f-111w. Economics of Agricultural Production. The principles of production economics elaborated in terms of the production of the major farm products and producing areas. Economic geography of agriculture. National production policies. Six credits. TThS I; 312HH. Mr. Johnson.
- 126s. Economics of Consumption. Formulation of the economic principles relating to choice between different uses of income and time and energy of individuals and family organizations. Three credits. MWF I, 311HH; MWF IV, 302HH.
- 131w. Market Prices. Analysis of the price making process as it works out in the market places where the major farm products are sold. Market quotations and price quoting. Three credits. TThS III; 312HH.
- 135s. Methods of Price Analysis. Statistical technique involved in analyzing seasonal and year-to-year movements in prices of farm products. Interpretation of results. Three credits. TThS III; 312HH.
- 140f. Marketing Organization<sup>1</sup> Staples. Principles of production economics applied to the organization of markets and marketing organization for the grains, tobacco, cotton, and wool. Especial attention to co-operative organization. Three credits. MWF II; 312HH. Mr. Jesness, Mr. Cox.

- 141w. Marketing Organization: Dairy and Poultry Products. Three credits. TThS II; 312HH. Mr. Jesness.
- 142s. Marketing Organization: Fruits and Vegetables. Two credits. MW III; 312HH. Mr. Jesness.
- 143w. Marketing Organization: Livestock and Meats. Two credits. TS IV; 312HH. Mr. Johnson.
- 160s.<sup>1</sup> Advanced Farm Finance. Three credits. F VI-VII; 104B.
- 170s. Land Economics. Three credits. TTh VII-VIII½; 302HH. Mr. Johnson.
- 190f. Agricultural Statistics. Intended for beginning graduate students who have had no course in the elements of statistical method. Three credits. TThS III; 312HH. Mrs. Kittredge.
- 191w. Advanced Agricultural Statistics. Three credits. MWF IV; 312HH. Mrs. Kittredge.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 200f-201w-202s. General Seminar in Farm Management and Agricultural Economics.<sup>2</sup> Credits ar. Mr. Jesness and staff.
- 203f-204w. Current Problems and Literature. No credits. Required of all candidates for degrees. F IX; 312HH. Mr. Jesness.
- 220f. Farm Surveys. An intensive study of the factors entering into farm organization. Special emphasis on selection, assembling, validity, and analysis of data. Attention given to studies in local production areas. Three credits. Ar. Mr. Garey.
- 221f. Farm Organization Studies. A seminar study of the principles involved in the analysis of farm organization data and the computation of farm costs. Attention will be given to methods used in collecting and compiling these data with special emphasis on farm records and accounts as a basis for farm organization study. Three credits. Mr. Pond.
222. Problems in Farm Record Analysis. A laboratory study of methods of recording and analyzing the farm business. Three to six credits. Mr. Pond.
- 223f-224w. Systems of Farming. A seminar course, including an intensive study of the factors determining the various systems of farming and production areas, with emphasis on specific types of farming. Three to six credits. Ar. Mr. Boss, Mr. Garey.
- 225w-226s. Advanced Farm Organization. Analysis of farm organization and the application of survey factors and cost factors in organizing the business of farming. Three to six credits. Ar. Mr. Boss, Mr. Pond.
- 227s. Seminar. Use of statistical methods in analyzing farm practices. Correlation studies. Importance of factors studied and measures of efficiency. Interpretation of results. Three credits. Ar. Mr. Carey.

<sup>1</sup> This course is offered on the Minneapolis campus.

<sup>2</sup> Under this head are arranged special seminars on subjects suited to the needs of the particular groups of graduate students, or on subjects upon which members of the staff are doing work at the time.



- 228s. Seminar in Farm Management. A study of the development of farm management research with special attention to the literature and with comparisons of methods employed. One to three credits. Ar. Mr. Boss, Mr. Pond, Mr. Garey.
230. Research Problems in Farm Organization and Operation. A study of methods of conducting research work and analyzing problems in farm organization and operation. Students will be assigned to individual research problems or to special phases of research work being conducted by members of the staff. Reports covering progress of work and analysis of findings required as a basis for credit. Three to nine credits. Mr. Boss, Mr. Pond.
- 237w. Seminar in Research Methods in Price Analysis. A survey and analysis of the various types of research projects being worked upon in the field of prices of farm products. Three credits. MF VI-VII.
- 240s. Seminar in the Marketing of Cereals. Three credits. MF VI-VII½; 312HH. (Offered in 1930-31 and in alternate years thereafter.) Mr. Jesness.
- 241s. Seminar in the Marketing of Livestock and Livestock Products. Three credits. MF VI-VII½. (Offered in 1929-30 and in alternate years thereafter.) 312HH. Mr. Jesness, Mr. Johnson.
- 244w. Seminar in Co-operative Marketing. Three credits. TTh VI-VII½. (Offered in 1929-30 and in alternate years thereafter.) 312HH. Mr. Jesness.
246. Seminar in the Economics of Consumption. Ar.
- 247f. Seminar in Research Methods in Marketing. Three credits. TTh VI-VII½. (Offered in 1930-31 and in alternate years thereafter.) 312HH. Mr. Jesness.
- 251w. Seminar in Transportation of Farm Products. Consideration of special topics, such as rural highway economics, incidence of transportation costs of farm products. Ar.
- 265f. Seminar in Agricultural Taxation. Three credits. Ar.

#### EDUCATION

Professors Leo J. Brueckner, Fred Engelhardt, Melvin E. Haggerty, Earl Hudelson, August Charles Krey, Wylle B. McNeal, Wilford S. Miller, Charles A. Prosser, Ashley V. Storm; Associate Professors Charles W. Boardman, Clara M. Brown, Albert M. Field, Frank W. Lathrop; Assistant Professors Helen D. Bragdon, Ross L. Finney, John G. Rockwell, Dora V. Smith, Marvin J. Van Wageningen; Professorial Lecturers Anne D. Blitz, Herbert E. Chamberlain, Wesley E. Peck.

*Prerequisites.*—For major work at least six quarter credits in psychology and in addition to this a total of not less than 12 quarter credits of undergraduate work in education.

Exemption from the language requirement for the Master's degree may be made in individual cases.

*Departmental conferences.*—Every alternate Monday all graduate students majoring in education are expected to meet with the departmental staff from 7:30 to 9:00 p.m. for conference regarding subjects of original investigation. This work carries no credit.

NOTE.—Candidates for the university teacher's certificate may offer Course 101, 102, or 103 in the place of Education I.

### GENERAL COURSES

- Ed.208i. Methods in Educational Research. A study of the methods employed in treatment and presentation of educational problems. Designed to aid students in the preparation of theses. Suggested for all candidates for degrees. Two credits. S I, II. Ar. Mr. Haggerty.
- Ed.228f-229w-230s. Problems of College Education. Fall term: Problems of Student Personnel. Winter term: Problems of College Curricula and Instruction. Spring term: Problems of Organization and Administration. The course will consist of discussions and lectures by members of the university staff. May be taken for credit by graduate students. Six credits. Ar. Mr. Haggerty.

### ADMINISTRATION AND SUPERVISION

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- Ed.Ad.113w. High School Curriculum. A study of types of programs of study, curricula, subjects of study, constants, variables, electives, distribution of subject-matter by years and units. Prerequisites: 10 hrs. in education including Ed. 55. Three credits. Ar.
- Ed.Ad.115. 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. (Not offered in 1929-30.)
- Ed.Ad.119f. The Elementary School Curriculum. A study of the principles underlying the selection and organization of subject-matter for courses in the elementary school; survey of scientific methods of curriculum making; examination of curricula, syllabi, and texts in the light of their function; survey of the findings of research by subjects. Prerequisites: 9 hrs. in education including Ed.Psy. 55. Three credits. MWF I; 104OLa. Mr. Peik.
- Ed.Ad.119Tw-120Ts. Elementary School Curriculum. (Same as above.) Four credits. S I, II. Mr. Peik or Mr. Lathrop.
- Ed.Ad.121w. Educational Advising of Women and Girls. A course designed to acquaint students with the problems of educational advising of girls and young women, particularly those of high school age. Students admitted to the course through conference with instructor. Prerequisite: 15 cred. in education and psy. Three credits. Ar. Miss Blitz.
- Ed.Ad.123s. Supervision of High School Instruction. The present status of high school supervision; its proper scope and function. A course combining consideration of principles and their application to improving high school instruction in the academic and special subjects. Prerequisites: 10 hrs. in education. Three credits. TTbS II; 104OLa.

- Ed.Ad.124f. Public School Administration. The organization, administration, and general support of public schools in states and local school districts. Prerequisite: 10 hrs. in education. Three credits. MWF IX; 210OL. Mr. Engelhardt.
- Ed.Ad.125w. Techniques in Administration. Standard practices regarding child accounting problems, records and reports; procedures having to do with personnel and school board relations and rules and regulations; standard office practices, including textbook and supply management. Prerequisite: Ed.Ad. 124. Three credits. MWF IX; 210OL. Mr. Engelhardt.
- Ed.Ad.126s. School Plant Management. Plant program planning and financing, including operation and maintenance of public school buildings. Prerequisites: Ed.Ad. 124, 125. Three credits. MWF X; 210OL. Mr. Engelhardt.
- Ed.Ad.127s. The City School Superintendent. A practical consideration of the duties of the superintendent: history; qualifications; present status; relations to the board of education, the staff, the pupils, and the public; types of administrative procedures; records; reports; professional ethics. Prerequisite: 10 hrs. in education. Two credits. (Not offered in 1929-30.)
- Ed.Ad.128f,w,s. Special Problems in Educational Administration. This course is designed primarily for superintendents and principals qualified to make intensive studies of specific problems related to the administration of a school system. Prerequisite: Ed. 124-125-126 or equiv. One or two credits. S; 224OL. Mr. Engelhardt.
- Ed.Ad.133af-133aw. Guidance in Secondary Schools. Emphasizes practices in educational and vocational guidance in junior and senior high schools, considering such phases as giving information about vocations, utilizing test results and school marks, and organizing the staff for guidance. Prerequisite: 10 hrs. in education including Ed.Psy. 55. Four credits. T IX, X; 104OLa.
- Ed.Ad.150f. Supervision and Improvement of Instruction. An analysis of the functions and duties of a supervisor as related to the improvement of instruction; specific supervisory technique; objective analysis of classroom activity; concrete applications to present day problems; case studies. Prerequisite: Ed.T. 15 or equivalent. Three credits. MWF III; 104OLa. Mr. Brueckner.
- Ed.Ad.151w. Supervision: Uses of Educational Tests in Improving Instruction. Objective evaluation of the results of teaching; diagnosis of pupil difficulty; remedial work; tests as aids to teaching; following up a testing program. Prerequisite: Ed.T. 15 or equivalent. Two credits. S III, IV; 104OLa. Mr. Brueckner.
- Ed.Ad.152w. Supervision—The Adjustment of Schools to Individual Differences. The adaptation of the school, the curriculum, and classroom procedures to the abilities and interests of pupils. Typical provisions; classification, emphasis upon classroom procedures; survey of the evi-

- dence. Prerequisites: 10 hrs. in education, incl. Ed.Psy. 55, Ed.T. 15, or equiv. Two credits. W IX, X; 104OLa. Mr. Peik.
- Ed.Ad.153s. Supervision of English in the Elementary Schools. Improvement of instruction in language, grammar, spelling, and handwriting; the results of scientific investigation; use of standardized and informal tests; remedial work. Prerequisite: Ed.T. 15 or equiv. Two credits. T IX, X; 104OLa. Mr. Brueckner.
- Ed.Ad.154s. Supervision of Social Sciences in the Elementary Schools. The scientific work being done on the course of study; in geography, history, science, and related fields; improvement of instruction in social sciences in the elementary schools. Prerequisite: Ed.T. 15 or equiv. Two credits. S III, IV; 210OL. Mr. Brueckner.
- Ed.Ad.155f. Supervision of Arithmetic in the Elementary Schools. The improvement of instruction in arithmetic; the evaluation of the course of study; standardized drill exercises; diagnosis of specific pupil difficulty and remedial work; tests as aids of teaching. Prerequisite: Ed.T. 15 or equiv. Two credits. S III, IV; 104OLa. Mr. Brueckner.
- Ed.Ad.156s. Practice in Supervision. Observation and field work. Classroom visitation in the University Elementary Demonstration School, the University High School, and other schools in or near the Twin Cities, followed by conferences. The application of supervisory techniques and follow up; special projects. Prerequisite: 15 hrs. in education, including Ed.Ad.150. Three credits. TTh 1:00-3:30. Ar. Mr. Peik.
- Ed.Ad.157f,w,s. Practice in Supervision. Problems and practice in the supervision of instruction in the elementary schools of Minneapolis and St. Paul. Prerequisite: consent of instructor. Nine credits. Ar. Mr. Brueckner.
- Ed.Ad.158w. Organization for Supervision. The organization and the administration of a public school system for supervision, treating specifically the delegation and co-ordination of the supervisory responsibilities of all staff members associated in these activities. Two credits. S I, II. Ar. Mr. Engelhardt.
- Ed.Ad.159s. Supervision of Reading. The improvement and supervision of instruction in oral and silent reading; the testing program; remedial work; evaluation of courses of study and textbooks; results of scientific investigations; special problems for study. Prerequisite: Ed.T. 15 or equiv. Two credits. S I, II. Ar. Mr. Peik.
- Ed.Ad.164. High School Administration. A study of the high school principalship, elimination from school, secondary vocational education, the marking system, record forms, classification of students, schedule of recitations, high school library, social organization and extra-curricular activities, community relationships, teaching schedule, building, costs. Prerequisite: 10 hrs. in education including Ed.Psy. 55. Three credits. TThS II; 104OLa.
- Ed.Ad.167f-168w. Junior High School. A study of the special purposes of this institution and the appropriate reorganizations to achieve them; the

- history of the movement. Prerequisites: 10 hrs. in education, including Ed.Psy. 55. Four credits. W IX, X; 104OLa.
- Ed.Ad.169s. Extra-Curricular Activities. Types of activities in junior and senior high schools; aims and values; practices in organizing, administering, and supervising; methods of evaluation. Prerequisite: 10 hrs. in education, including Ed.Psy. 55. Two credits. T IX, X; 104OLa.
- Ed.Ad.170f,w,s. Special Problems in Secondary Education. Planned primarily for those at work in high schools who are qualified to make intensive studies relating to administration and supervision of secondary education. Consult instructor before registering. Prerequisite: 10 hrs. in education, including Ed.Psy. 55. Two credits. Ar.
- Ed.Ad.172w. Curriculum and Course of Study Construction. A study of the techniques employed at the public school and college levels. Class and individual projects according to needs and interests. Prerequisite: 15 hrs. in education. Two credits. S III, IV; ar. Mr. Peik.
- Ed.Ad.175s. Financial Aspects of Public School Business Administration. Financial program planning, budgeting accounting, cost finding, income and expenditure control; and the preparation and analysis of financial reports. Prerequisites: Ed.Ad. 124, 125. Three credits. MWF IX; 210OL. Mr. Engelhardt.
- Ed.Ad.178f. School Surveys. A study of the literature and methods of school surveys, as a basis for the investigation of practical problems in school administration and supervision. Three credits. MWF X; 224OL. Mr. Engelhardt.
- Ed.Ad.184f. Supervision of Practice Teaching. A course primarily for teachers engaged in the direction of practice teachers in secondary education. Two credits. S 9:00-11:00 a.m.; ar. Mr. Boardman.
- Ed.Ad.185f. Investigation of Problems in Teacher Training. A study of the status, the practices, and the special problems of the institutional training of teachers for public school positions, including rural and special teachers; recent investigations; selected problems for study; individual projects according to special fields of interest. Two credits. W IX, X; ar. Mr. Peik.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- Ed.Ad.205f-206w-207s. Seminar in Educational Administration. Prerequisites: Ed.Ad. 124-125-126, Ed.Ad. 150, 151, 152. Th IX, X; 224OL. Mr. Engelhardt.
- Ed.Ad.218f-219w-220s. Seminar in Secondary School Problems. Th IX, X; ar.
- Ed.Ad.225f-226w-227s. Seminar in Elementary School Problems. Th IX, X; ar. Mr. Brueckner, Mr. Peik.

## AGRICULTURAL EDUCATION

*Prerequisites.*—For major or minor work, 18 credits in agricultural education and preparation in agricultural subjects satisfactory to the Department of Agricultural Education.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 131w,s.** Methods in Teaching High School Agriculture. Fundamentals of method in teaching as related to teaching agriculture in high school. Organizing subject-matter of daily work; selection and manipulation of devices. Classroom and laboratory method. Specific plans for teaching secondary agriculture. Prerequisite: Ag.Ed. 11. Five credits. MTWThF III winter; MTWFS IV spring; 202Ad(F). (Not offered in 1929-30.) Mr. Field.
- 135s.** The Curriculum in Vocational Agriculture. A study of curriculum organization, determination of subject-matter, organization of subject-matter, job analysis, course construction, texts, and references. Prerequisite: Ag.Ed. 11. Three credits. Ar.
- 141.** Supervised Practice in Vocational Agriculture. A special methods course dealing with the selection, planning, supervising, and summarizing of the practical work in agriculture. Special emphasis on the problem method of teaching, and the use of the farm and community for teaching purposes. Prerequisite: Ag.Ed. 11. Three credits. Ar. Mr. Field.
- 144w,su.** Course Organization and Instruction for the Individual in Vocational Agriculture. Subject-matter content for the individual should be based on farm activities. Individuals should progress according to abilities and needs. Accepting these principles, this course includes selection and organization of content, administration, and teaching technique. Prerequisites: Ag.Ed. 11, 181, 182, 183. Three credits. Ar. Mr. Storm, Mr. Field.
- 151w,s.** Organization and Management. Organization and management of work in secondary schools, particularly in Minnesota, with special reference to agricultural work, courses of study, programs, equipment, laboratory and class management, extension work, plots, and co-ordination of work. Prerequisites: Ag.Ed. 11, 21. Five credits. MTWFS IV; 202Ad(F). (Not offered in 1929-30.) Mr. Storm, Mr. Field.
- 153f.** Consolidated Rural Schools. To prepare principals to meet the problems of organization and management peculiar to consolidated rural schools, such as building arrangements, curriculum adjustments, transportation of pupils, and home project work. Prerequisite: Ag.Ed. 11. Three credits. Ar.
- 154w,s.** Rural Education and Community Life. The rural school as a community center, and ways and means of organizing educational and recreational activities, such as clubs, festivals, fairs, and other desirable features of rural community life. Prerequisite: Ag.Ed. 11. Three credits. Ar.
- 155.** Consolidated Rural School Problems. Opportunity for intensive study and research in special problems of administration and supervision of village and consolidated rural schools. Prerequisites: Ag.Ed. 11, 153 or equivalent. Three credits. Ar.
- 161.** Vocational Education in Agriculture. A study of the principles developed and established in agricultural education. The principles de-

- veloped in other vocational education and their relation to agricultural education. Three credits. Ar.
162. The Basis of Vocational Teaching Technique. A course which includes an analysis of the philosophical, psychological, and other bases of teaching technique from the viewpoint of the teacher of vocational agriculture. Three credits. Ar.
164. Fundamentals of Agriculture. Emphasis on current problems in meats, milk, poultry, plant pathology, mechanical training, and other essentials for teachers of agriculture. Three credits. Ar.
- 171W,S. Problems in Procedure. For agriculture teachers. Emphasizes working out problems in detail in order that the processes as formulated can be used in teaching the following year by those enrolled. Discussions, readings, papers, laboratory. Prerequisites: Ag.Ed. 11, 181, 182, 183, or equivalent. Three credits. Ar. Mr. Lathrop.
- 176S. Problems in Visual Presentation. Special attention to use of visual aids in teaching agriculture. The development of proper visual methods by means of research. Prerequisite: Ag.Ed. 75. Three credits. Ar. Mr. Field.
- 181f-182w-183s. Teaching Agriculture. A study of all activities of the teacher in conducting a high school agriculture department in Minnesota including all day, part time, evening, and elementary classes, and community activities. Observation, participation, reading, preparing plans, criticisms, discussions, reports. Prerequisite: Ag.Ed. 11. Fifteen credits. Mr. Storm, Mr. Field.
- 191-192-193. Seminar in Agricultural Education. Critical studies of important problems in agricultural education; opportunity for individual investigation and research; review and interpretation of current educational literature. Two to six credits. Ag.Ed. staff.

#### SPECIAL COURSES FOR TEACHERS OF AGRICULTURE

By special arrangement, two courses of three credits each have been divided into halves, A and B, each of three weeks' duration and each carrying  $1\frac{1}{2}$  credits. The maximum student load of these half courses during the three weeks' period, is three  $1\frac{1}{2}$ -credit courses. Credit in each of these "A" courses will be suspended until the student finishes the "B" portions of the same course. The "B" portions will be offered some time later.

- 161Asu. Vocational Education in Agriculture. Vocational education as interpreted by current philosophical conceptions and theories. A study of the principles developed and established in agricultural education. Special emphasis on prevocational agriculture and vocational guidance. Lectures, discussions, and selected readings from the literature of each of the problems presented for discussion. ( $1\frac{1}{2}$  credits on completion of Ag.Ed. 161B.) Mr. Storm, Mr. Field.
- 231Asu. Theory and Practice of Teaching Agriculture. A special course designed for teachers in service in agriculture. A functional analysis of current problems in developing the course of study in agriculture,

farm practice work, and evening school instruction. Modern trends in educational theory and practice treated to meet the peculiar needs of individual teachers. (1½ credits on completion of Ag.Ed. 231B.) Mr. Storm, Mr. Field.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Advanced Seminar. Study of the broader administrative problems and policies in the field of agricultural education. Opportunity for independent investigation and research. One to two credits per quarter. 202Ad(F). Mr. Storm, Mr. Field, Mr. Lathrop.
- 221f-222w-223s-224su. Graduate Problems. Making investigations, gathering data, and formulating plans regarding agricultural education. Three credits. 207Ad(F). Mr. Storm, Mr. Field, Mr. Lathrop.
- 241f. Operation of Vocational Agriculture. Problems involved in the state and local activities in conducting vocational agriculture. It includes a study of federal and state laws and regulations, courses of study, duties of the state supervisor, reports, records, and conferences. Two credits. Ar. 202Ad(F). Mr. Storm, Mr. Field, Mr. Lathrop.
- 242w,s. Organization and Administration of Teacher Training for Vocational Agriculture. Development of teacher training institutions, agricultural college curricula, professional needs of high school teachers, professional courses and their content, equipment, itinerant teacher training, practice teaching, teacher evaluation. Two credits. Ar. 202Ad(F). Mr. Storm, Mr. Field, Mr. Lathrop.
- 243su. Same as 242 with the addition of concrete studies of specific institutions. Not open to students having credit for 242. Three credits. Ar. 202Ad(F). Mr. Storm, Mr. Field, Mr. Lathrop.

#### EDUCATIONAL PSYCHOLOGY

##### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- Ed.Psy.111Tf-112Tw. Educational Measurements in the Elementary School. The typical educational problems involving educational scales and standard tests. Nature of tests, methods of use, analysis of results obtained, and programs of remedial educational procedure based on the results of the tests. Four credits. Prerequisite: Ed.Psy. 55 or equiv. S I, II. Mr. Van Wagenen.
- Ed.Psy.111s. Same as above. Three credits. MWF II. Mr. Van Wagenen.
- Ed.Psy.113f-114w-115s. Psychology of Elementary School Subjects. A discussion of the research studies in the field of the psychology of elementary school subjects. Prerequisite: 10 credits in education and psychology. Two credits. W IX, X. 115Psy. Mr. Van Wagenen.
- Ed.Psy. 116w-117s. Advanced Statistical Methods in Education. A survey of statistical studies in education with special reference to the methods employed and the reliability of the results obtained. Prerequisite: Ed.Psy. 60 or equiv. Four credits. T IX, X; 115Psy. Mr. Van Wagenen.
- Ed.Psy.130s. Vocational Psychology. Methods of judging vocational interests and aptitudes, psychological analysis of learning or the acquisition



- of skill, transfer of training, motives and incentives. Intended for students especially interested in vocational and industrial education and training. Prerequisites: Psy. 1, 2, 4 and additional credits in economics, education, or psychology. Two credits. F IX, X; 301F. Mr. Paterson.
- Ed.Psy.133w. Systematic Educational Psychology. Advanced course covering the field of psychology as related to education. Open to seniors and graduate students. Prerequisite: 15 credits in education and psychology. Four credits. MTThF III; 104OLa. Mr. Rockwell.
- Ed.Psy.134f. Mental Tests. A laboratory study of group mental tests used in the kindergarten, elementary school, high school, and college with special emphasis upon their reliability and validity as instruments for educational guidance. Prerequisites: Ed.Psy. 55 and 60 or equiv. Two credits. MW VII, VIII; 211Psy. Mr. Miller.
- Ed.Psy.135w-136s. Problems in Mental Testing. A study of the practical problems of mental testing in the public schools with special reference to the administration of group mental tests. Prerequisites: Ed.Psy. 55 and 60 or equiv. Four credits. MW VII, VIII; 211Psy. Mr. Miller.
- Ed.Psy.138f-139s.† Experimental Educational Psychology. A laboratory course designed to train students in the use of experimental methods in the study of educational problems, particularly in the field of the psychology of learning. It is suggested that this course supplement either 133 or 190, 191, 192, 193-194. Prerequisite: Ed.Psy. 55 or equiv. Four credits. WF IX, X; 116Psy. Mr. Rockwell.
- Ed.Psy.141r. Psychology of Speech Disorders. (Not offered in 1929-30.)
- Ed.Psy.143f-144w.† Individual Mental Examination. For teachers of sub-normal children. Demonstration and practice in mental diagnosis. Careful study will be made of different groups and systems of mental tests, and other clinical methods with discussion of general theory involved. Prerequisites: Ed.Psy. 55 and 111 or 134, permission of instructor. Four credits. Ar. Mr. Rockwell.
- Ed.Psy.145s. Special Problems in the Field of Individual Mental Testing. Prerequisite: Ed.Psy. 143-144. Two credits. Ar. Mr. Rockwell.
- Ed.Psy.146w-147s. Child Guidance. Specific problems in school adjustment dependent upon physical and emotional factors of the child, the home, and the environment. Case records giving family and personal histories, physical condition, psychometric rating, and personality presented. Class discussion of the recommendations. Prerequisite: 15 credits in psychology and education. Four credits. S III, IV; OLa. Aud. Mr. Chamberlain.
- Ed.Psy.149f-150w†-151s. Psycho-Educational Clinic. Conducted in co-operation with existing clinics and agencies in the Twin Cities. Students will receive practice in giving psychological examinations, in case study, and in scientific interpretation of data. Two to six credits. Prerequisites: 134-135-136, 144-145 or 184, 111, permission of instructor. Ar.
- Ed.Psy.153f-154w-155s. Research Problems. Intended for properly prepared students who desire to pursue special investigation in the field of

- educational psychology. Ar. Mr. Haggerty, Mr. Miller, Mr. Rockwell, Mr. Van Wagenen.
- Ed.Psy.156f-157w. Psychology of Child Development. The physical, mental, social, and emotional development of children from birth to adolescence. Prerequisites: for 156, 6 credits in psychology; for 157, Ed.Psy. 156. Four credits. S I, II. Mr. Rockwell.
- Ed.Psy.158f. Psychology of Adolescence. A study of the physical and mental changes that characterize the transition from childhood to adult life. Implications for educational guidance during the period of secondary education. Prerequisite: Ed.Psy. 55 or equiv. Three credits. MWF VI; 104OLa. Miss Bragdon.
- Ed.Psy.159w. Psychology of Personality. Theoretical basis. Survey of methods for the measurement and study of character and the emotions. Relation to school success and other factors in the school situation. Genetic development of personality traits in childhood and adolescence. Prerequisites: Ed.Psy. 55 or equiv. Three credits. Ar.
- Ed.Psy.181f,w,s. Practice in Personnel Work. Course designed to give properly qualified students practical experience in the use of psychological and related methods in dealing with school children. Prerequisite: satisfactory preparation in psychology and education and approval of adviser. Ar. Mr. Haggerty, Mr. Smith, Mr. Rulon.
- Ed.Psy.183s. Psychology of Gifted Children. A study of the physical and mental traits of gifted children and the methods of their education. Prerequisite: Ed.Psy. 55 or equiv. Two credits. TTh III; 104OLa. Miss Bragdon.
- Ed.Psy.184s. Mental Deficiency. Survey of mental deficiency in children and adults. Physical traits, including study of brain defects, causes and heredity; psychology of mental deficiency; social problems of feeble-mindedness. Subjects treated with reference to the training of defectives. Prerequisite: Ed.Psy. 55 or equiv. Two credits. S III, IV. Mr. Rockwell.
- Ed.Psy.189s. The Human Organism. The development of the human organism in relation to educational practice. Prerequisite: permission of instructor. Three credits. MWF III. Ar. Mr. Rockwell.
- Ed.Psy.190f. Original Nature of Man. Advanced work in genetic psychology, man's unlearned behavior, and inherited capacities. Prerequisites: Ed.Psy. 55 and 60 and permission of instructor. Three credits. MWF III; 301Psy. Mr. Miller.
- Ed.Psy.191w. Individual Differences. A study of group and individual differences and their relations to educational practice. Prerequisites: Ed.Psy. 55 and 60 and permission of instructor. Three credits. MWF III; 301Psy. Mr. Miller.
- Ed.Psy.192s. Recent Literature in Educational Psychology. Readings and reports on problems in educational psychology. Prerequisites: Ed.Psy. 55 and 60 and permission of instructor. Three credits. MWF III; 301Psy. Mr. Miller.

- Ed.Psy.193w-194s. Psychology of Learning. A study of the experiments in learning in the laboratory and in the classroom. Prerequisite: 9 credits in psychology and educational psychology. Four credits. TTh II; 301Psy.
- Ed.Psy.197-198-199. Seminar: Problems of Subnormality. Phases of subnormality studied intensively. Review of important literature and original investigation. Students required to make reports on assigned topics and submit a paper on some problem at the close of the quarter. Six credits. Ar. Mr. Rockwell.

## COURSE PRIMARILY FOR GRADUATE STUDENTS

- Ed.Psy.201f-202w-203s. Seminar in Educational Psychology. A research course for graduate students. Required of all students writing theses in educational psychology. Does not carry credit as course work. M IX, X. Mr. Haggerty, Mr. Miller, Miss Bragdon, Mr. Rockwell, Mr. Van Wagenen.

## HISTORY AND PHILOSOPHY OF EDUCATION

- H.Ed.101f. Foundations of Modern Education. Historical analysis and interpretation of the more important elements in modern education derived from the Hebrews, Greeks, Romans, Middle Ages, and Renaissance. Prerequisite: 6 credits in psychology. Three credits. MWF VII; 210OL. Miss Alexander.
- H.Ed.102w. History of Modern Secondary and Higher Education. A survey of existing types of American and European secondary and higher schools, followed by a historical study of their origin, aims, growth. Prerequisite: 6 credits in psychology. Three credits. MWF VI; 210OL. Miss Alexander.
- H.Ed.103s. History of Modern Elementary Education. The institutions, theories, and problems of modern elementary education in the light of their history. Emphasis upon the rise of state systems and upon the history of modern educational reform. Prerequisite: 6 credits in psychology. Three credits. MWF VI; 210OL. Miss Alexander.
- H.Ed.140w-141s. Topics in the History of Education. Historical investigation of educational problems. Prerequisite: permission of instructor. Ar. Mr. Krey.
- H.Ed.187f,w,s. Seminar in Educational Sociology. The sociological foundations of educational theory will be discussed with the investigation of specific problems. Lectures, readings, and problems. Prerequisite: permission of instructor. Ar. Mr. Finney.

## HOME ECONOMICS EDUCATION

See Home Economics.

## INDUSTRIAL EDUCATION

- Ind.105w. Industrial Education. (For superintendents, principals, and teachers not specializing in the field named. *Denied* to undergraduate majors or minors in the special field.) Objectives, programs, practices, laws and rulings, standards for aid, significant literature. General and vocational phases considered. Three credits. TThS I. Mr. Smith.
- Ind.110w. Guidance in the Schools. The history of the guidance movement; typical public school means and methods; the presentation of occupational information; the junior wage earning situation; attendance, child labor and continuation laws; placement and follow-up plans. Prerequisite: Ed.Psy. 134. Two credits. F IX, X; 201OL. Mr. Smith.
- Ind.150f-151w-152s. Problems in Vocational Education. Survey of studies in the field, individual and group investigation, reports, and criticisms. Advised for all students writing theses in the special field of industrial education, general or vocational. Six credits. M 7:30-9:30 p.m.; 212OL. Mr. Prosser.
- Ind.170f. Administration of Industrial Education—Day Schools. National, state, and local organization and support of day industrial schools; adaptable types, buildings, and equipment, promotion and advertising, co-operative agreements and relationships, supervision of instruction, student placement. General versus unit course organization. Relation to part time and evening instruction. Two credits. F IX, X; 212OL. Mr. Craigo.
- Ind.171w. Administration of Industrial Education—Evening Schools. Development of the after training of adults; agencies and scope of the movement; state supervision, national and state legislation; qualifications of instructors, problems and difficulties, records and certification, fees and charges; buildings, equipment, and instruction facilities. General versus unit course organization. Costs. Prerequisite: Course 170. Two credits. F IX, X; 210OL. Mr. Bass.
- Ind.172s. Administration of Industrial Education—Part Time Classes. A study of the new movement for part time education. Social and economic background, methods of organizing classes, a study of the special student groups, courses of study. Typical schools, comparative state legislation and plans. Minnesota's problems. Prerequisite: Course 171. Two credits. M IX, X; 210OL. Mr. Prosser.

## THEORY AND PRACTICE OF TEACHING

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- Ed.T.110w. Educational Diagnosis in Secondary Education. The application of educational measurements to the solution of the problems of high school instruction. Analysis of the specific learning processes involved in the various high school subjects; a critical survey of the means of diagnosing and alleviating high school pupils' learning difficulties; the use of educational measurements in improving high school teaching. Prerequisite: Ed.Psy. 55. Two credits. Th IX, X. Mr. Hudelson.

- Ed.T.122s. Literature for Adolescents. A background for pupil guidance in extensive reading in junior and senior high schools; analysis of studies of adolescent choices in literature; principles of selection; critical reading in broad field of literary, biographical, historical, scientific, and vocational interests of boys and girls. Prerequisites: Ed.T. 15 or jr.-sr. h.s. teaching experience. Two credits. W IX, X. Mr. Smith.
- Ed.T.143Tf-144Tw.† The Teaching of Reading. A study of the objectives, the materials, and teaching procedures in lower, intermediate, and upper grades in the light of the contributions of research; survey of current practices and curricula, class and individual projects; observation of reading techniques and materials in the demonstration school. Prerequisites: 9 hrs. in education including Ed.Psy. 55 or 56. Four credits. S I, II. Mr. Peik.
- Ed.T.181w. Technique of Elementary School Instruction. A critical study of the various types and methods of elementary classroom activity with emphasis upon the techniques and the function of the so-called newer methods. Observation in the demonstration school; class projects; survey of investigations and of the philosophic theories which are affecting progressive practice. Prerequisites: 10 hrs. in education including Ed.Psy. 55 or 56. Three credits. MWF I. Mr. Peik.
- Ed.T.181Tf-182Tw.† Technique of Elementary School Instruction. (Same as Ed.T.181 above.) Four credits. (Not offered in 1929-30.) Mr. Peik.
- Ed.T.193f. Foundation of Secondary School Methods. A study of the investigations which form the bases of the technique of high school instruction and the application of their results to high school subject-matter and to high school classroom procedure. Prerequisite: Ed.T. 15. Three credits. Th IX, S III, IV. Mr. Hudelson.
- Ed.T.195w. Problems of High School Composition Teaching. An intensive study of research problems in high school composition teaching. Individual problems; classroom experiments; submission of proposals for the adaptation of subject content to high school students, special methods of teaching, and measurement of results in language and composition. Prerequisites: Ed.T. 15 and Ed.T. 50 or Ed.T. 52 or equiv. Mr. Hudelson, Miss Smith.
- Ed.T.196s. Problems of High School Literature Teaching. An intensive study of research problems in high school literature teaching. Individual problems; classroom experiments; submission of proposals for the adaptation of subject content to high school pupils, special methods of instruction, and the measurement of results in reading and literature. Prerequisites: Ed.T. 15 and Ed.T. 50 or Ed.T. 52, or equiv. Mr. Hudelson, Miss Smith.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- Ed.T.201f-202w-203s. Teaching of History and the Other Social Studies. Open only to graduate students who have had teaching experience. Consent of the instructor is necessary. Two credits per quarter. W IX, X. Mr. Krey.

Ed.T.222f-223w-224s. Seminar in Problems of High School Instruction. Prerequisites: Ed.T. 15 and Ed.Ad. 113 or equiv. Ar. Mr. Hadelson, Miss Smith, Mr. Hurd, Mr. Stokes.

### ELECTRICAL ENGINEERING

Professors John M. Bryant, William T. Ryan, Franklin W. Springer; Associate Professor Cyril M. Jansky, Jr.; Assistant Professors Henry H. Hartig, Elmer W. Johnson, John H. Kuhlman, Milo E. Todd.

*Prerequisites.*—For major work, Courses 121 to 126 or their equivalent; for minor work, 6 credits in physics, also integral calculus.

### DIRECT CURRENT

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 111f-113w-115s. Electrical Machinery. Prerequisite: one year in college physics, three credits per quarter. MWF 9:30. Mr. Springer.  
 112f-114w-116s. Electrical Machinery Laboratory. To be taken with Course 111-113-115. Lectures and practice. Prerequisite: Phys. 41-42. Two credits per quarter. Mr. Springer.

### ALTERNATING AND TRANSIENT CURRENTS

- 121f-123w-125s. Alternating Currents. Prerequisite: E.E. 115. Three credits per quarter. MWF 10:30 or 11:30. (Two sections.) Mr. Ryan, Mr. Johnson.  
 122f-124w-126s. Alternating Current Laboratory. To be taken with Course 121-123-125. Prerequisite: E.E. 116. Two credits per quarter. Mr. Ryan, Mr. Johnson.  
 127f. Transient Electrical Phenomena. Mathematical study of the electric circuit containing resistance, inductance, and capacity. Abnormal currents and voltage upon switching circuits containing iron core inductances. Prerequisite: E.E. 121. Two credits. Mr. Bryant.  
 128w. Transient Electrical Phenomena. Current and voltage distribution in circuits containing distributed resistance, inductance, and capacity. Distortion in telephone lines and its correction. Prerequisite: E.E. 127. Two credits. Mr. Bryant.  
 129s. Transient and High Frequency Phenomena. Transient phenomena in coupled circuits. Distribution of current and flux in conductors at high and low frequencies. Change of resistance with frequency. Theoretical study of special problems. Prerequisite: E.E. 128. Two credits. Mr. Bryant.

### DESIGN

- 132f-134w-136s. Electrical Design. Prerequisite: E.E. 115. To be taken with Course 121-123-125. Two credits per quarter. Mr. Kuhlman.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 232f-234w-236s. Electrical Design. Special problems. Prerequisites: E.E. 125, 136. Credits as arranged. Mr. Kuhlman.
- 237s. Electric Power Transmission Design. Preparation of detailed plans and specifications for the construction of high voltage transmission lines and distributing systems. Economic, electrical, and mechanical principles and calculations. Mr. Bryant, Mr. Ryan.

## ELECTRIC POWER

- 141f. Central Stations. Operation, design, and construction of electric power generating stations. Prerequisite: E.E. 115. Two credits. ThS 10:30. Mr. Ryan.
- 142w. Electrical Transmission. Prerequisite: E.E. 141. Two credits. ThS 10:30. Mr. Ryan.
- 144w. Railway Electrical Engineering. Prerequisite: E.E. 115 or 45. Two credits. MW 11:30. Mr. Johnson.
- 145s. Steam Railroad Electrification. Prerequisite: E.E. 144. Two credits. MW 11:30. Mr. Johnson.

## ELECTRIC LIGHTING

- 151f. Electric Lighting. Lectures, problems, and laboratory practice. Prerequisite: one year in college physics. One credit. Mr. Johnson.
- 152f. Photometric Laboratory. Photometric studies of incandescent and arc electric lamps, gas and oil lamps. Bench and radial photometers and illuminometers. To be taken with E.E. 151. One credit. Mr. Johnson.
- 251w-253s. Illuminating Engineering. Lectures and laboratory work. Methods of determining location, kind, and quality of lights for obtaining desired illumination. Prerequisite: E.E. 151. Two credits per quarter. Mr. Johnson.

## COMMUNICATION

- 161f. Radio Communication. Phase relations in high frequency circuits. Mathematical theory of damped wave transmission and receiving circuits. Inductance and capacity measurements using damped waves. The electron tube as a detector and amplifier. Signal Corps apparatus. Prerequisite: registration in E.E. 121. Three credits. ThS 8:30. Laboratory sections. Mr. Jansky.
- 162w. Radio Communication. Theory and measurement of logarithmic decrement. Undamped wave transmitting and receiving circuits. Heterodyne reception. The arc, high frequency generator, and electron tube as sources of high frequency power. High frequency measurements, using undamped waves. Prerequisite: E.E. 161. Three credits. ThS 8:30. Laboratory sections. Mr. Jansky.
- 163s. Radio Communication. Mathematical theory of the electron tube and its use in the radio circuit. Design of electron tube oscillator and

- amplifier circuits. Radio telephony, modulation, carrier frequencies. Direction finding apparatus and selective circuits for interference elimination. Prerequisite: E.E. 162. Three credits. ThS 8:30. Laboratory sections. Mr. Jansky.
- 164f. Telegraph and Telephone Apparatus. Theoretical and experimental study of apparatus used for signaling, telegraphy, and telephony. Lectures and laboratory. Prerequisite: to be taken with Course 121. Two or three credits. Mr. Hartig.
- 165w-166s. Telegraph and Telephone Circuits. Theoretical and experimental study of telegraph and telephone circuits and the phenomena of long line transmission. Prerequisite: Course 164. Two credits per quarter. Mr. Hartig.
- 167f-168w-169s. Radio Station Operation. For men already proficient, licensed radio operators. Open only to a limited number by permission. One or two credits per quarter. Mr. Jansky.
- 181s. Communication Frequency Measurements. Vector treatment of network. Bridge circuits for measuring of resistance, inductance, and capacity at audio and radio frequencies. Prerequisite: Course 126. Two credits. Mr. Hartig.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 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 Course 262-264-266. Two credits per quarter; registration by permission. Mr. Jansky.
- 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. One or more credits per quarter; registration by permission. Mr. Jansky.
- 267f-268w-269s. Telephone Transmission. Advanced transmission theory at communication frequencies. Class and laboratory. Two or three credits; registration by permission. Mr. Hartig.
- 275f-276w-277s. Electrical Engineering Research. Investigation of special research problems in laboratory or library. Prerequisite: E.E. 126. Two to four credits per quarter. Mr. Bryant, Mr. Ryan, Mr. Springer, Mr. Jansky, Mr. Hartig, Mr. Johnson, Mr. Kuhlman, Mr. Todd.
- 287f-288w-289s. Advanced Communication Laboratory and Seminar. Special problems in communication. Study and discussion of current articles on communication. Two or three credits; registration by permission. Mr. Hartig.

#### MEASUREMENTS

- 183f-184w-185s. Electrical Laboratory. Efficiency tests and special problems. Prerequisite: E.E. 126. Credits as arranged. Mr. Springer.



- 186w or s. High Tension Testing. Low frequency pressure up to 320,000 volts and high frequency to several million volts applied to the study of dielectric phenomena, testing of high tension equipment, etc. Prerequisite: E.E. 124. Two credits. Mr. Springer.
- 187f, 188w, 189s. Special Communication Laboratory. Special problems in electrical communication. Open by permission to qualified students. Includes weekly seminar meeting. One to twelve credits total. Mr. Swenson.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 281w-282s. Advanced High Frequency Measurements. Vector treatment of circuit networks. Bridge circuits for the measurement of resistance, inductance, and capacity at audio and radio frequencies. Prerequisite: E.E. 126. Two credits per quarter. Mr. Jansky.
- 284f-285w-286s. Precise Electrical Engineering Measurements. Lectures and laboratory work. Open to a limited number subject to approval. Prerequisites: E.E. 123, 124. One or two credits. Mr. Todd.

## MISCELLANEOUS

- G.E.111s. 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. Open only to seniors and graduates. Two credits. Mr. Ryan and non-resident lecturers.
- G.E.124w. Engineering Relations. Lectures, assigned reading, and discussions on the human side of engineering. Relations of the engineer to employer, employees, customers, and public. Engineering code of ethics. Bridging between college and business. Practical training of engineering graduates. Open only to seniors and graduates.
- 291f-292w-293s. Graduate Seminar. Discussions of problems and results of research work. One credit per quarter.
- 294f-295w-296s. Electrical Ignition and Automobile Electrical Accessories. The study of ignition apparatus; characteristics of automobile accessories, such as generators, starters, controllers, etc. Laboratory and lectures. Prerequisite: E.E. 121 or equiv. Two credits per quarter. Mr. Springer.

## ENGLISH

Professors Cecil A. Moore, Joseph W. Beach, Frederick Klaeber<sup>1</sup> (Comparative Philology), Martin B. Ruud, Elmer E. Stoll,<sup>1</sup> Joseph M. Thomas; Associate Professors J. Douglas Bush, G. Tremaine McDowell; Assistant Professors Muriel B. Carr,<sup>1</sup> Elizabeth Jackson, Charles W. Nichols, Anna H. Phelan.

Before registering for graduate courses, students should consult with the director of graduate work for the department, Mr. Bush.

<sup>1</sup> Absent on leave, 1929-30.

Before the acceptance of his subject for a thesis, a candidate for the degree of M.A. or Ph.D. must have given evidence to the department that he speaks and writes English with propriety.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

1. *Prerequisite.*—(1) For major work, not less than 27 credit hours in English literature, 12 of which must be of senior college grade, including a satisfactory course in either Chaucer or Shakespeare; for minor work, not less than 27 credit hours in English literature. (2) Unless special exception is made upon petition to the department, the candidate is required to have a reading knowledge of French and German.

2. The minimum requirement of 18 credits in the major is interpreted to mean 18 credits in subjects listed below as "Courses in English." If the candidate has not previously had an elementary course in Old English, this subject must be included in his program of graduate study.

#### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

1. *Delimitation of the field.*—The general field of English is divided into two periods (1) Early English and (2) Modern English. The boundary line between these periods may be drawn anywhere between 1500 and 1550 according to the requirements of the candidate's program. A candidate may select as his major subject either the Early English or the Modern English period.

2. The candidate will be examined as to his knowledge of the whole field of English literature, but much more thoroly in that portion of the field covered by his major. Special emphasis will be laid, in the examination, on one particular period or one particular type (such as drama, lyric, or essay) with which he is presumed to be especially familiar. This particular period or type would naturally be that connected with his thesis.

3. The candidate must have completed, before examination, advanced courses in Chaucer and Shakespeare.

4. A good reading knowledge of Latin is in all cases desirable, and in some cases may be indicated by the candidate's adviser as indispensable.

### COURSES IN ENGLISH

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 100f. Old English. Old English prose and poetry. The relation to modern English is particularly emphasized. Prerequisite: 8 credits above 50. Four credits. TThFS III; 305F. Mr. Ruud.
- 101f. Middle English. An outline of Middle English grammar, including the interpretation of selected texts. Prerequisites: English 75 and 100. Two credits. (Not offered in 1929-30.) Mr. Klaeber.
- 102w. Old English Poetry. Critical reading of poems. Three credits. Prerequisite: Course 100. MWF II; 204F. Mr. Ruud.
- 103s. Beowulf. An introduction to the Old English poem, with reading of considerable portions of the text. Prerequisite: Course 100. Three credits. T VII, VIII, Th VII; 217F. Mr. Ruud.

- 105w-106s. Eighteenth-Century Poetry. From Pope to Burns, with special reference to the rise and growth of romanticism. Prerequisite: 8 credits above 50. Six credits. MWF VII; 204F. Mr. Moore.
- 107w-108s. Eighteenth-Century Prose. Special study of fiction and the essay. Prerequisite: 8 credits above 50. Six credits. (Not offered in 1929-30.) Mr. Moore.
- 109f-110w. The Romantic Poets of the Nineteenth Century. From Wordsworth to Keats. Prerequisite: 8 credits above 50. Six credits. TThS III; 205F. Mr. Beach.
- 111f-112w. Seventeenth-Century Prose. General survey of the prose of the century to 1660. Prerequisite: 8 credits above 50. Six credits. MWF III; 205F. Mr. Bush.
- 123f-124w-125s. The Technique of the Novel. Special studies in novels of the late nineteenth and twentieth centuries, with particular regard to structure. Prerequisite: 8 credits above 50 and the permission of the instructor. Nine credits. T 4:00 to 6:00 p.m.; 205F. Mr. Beach.
- 126-127. Drama, 1660-1880. (Not offered in 1929-30.)
- 129s. Modern Drama. Contemporary drama from 1870 to the present. Prerequisite: English 55-56. Four credits. (Not offered in 1929-30.) Mr. Stoll.
- 133w. The English and Scottish Popular Ballads. A study of a large number of traditional ballads, English and foreign, and of ballad style and origins. Prerequisite: 8 credits above 50. Three credits. MWF I; 204F. Mr. Ruud.
- 136s. Advanced Shakespeare. Shakespeare's development traced to the end. A careful analysis of four plays. Problems in the interpretation of Shakespeare's dramatic methods. Prerequisite: English 55-56. Four credits. (Not offered in 1929-30.) Mr. Stoll.
- 140s. Advanced Chaucer. The more important poems (except those read in Course 75). The treatment will be primarily literary and historical, linguistic proficiency being presumed. Prerequisite: 8 credits above 50, including 75. Four credits. MTWF II; 205F. Mr. Ruud.
- 141f-142w-143s. Historical Grammar of the English Language. This course is identical with Comparative Philology 141-142-143. Prerequisite: 8 credits above 50, including 75 or 81-82. Six credits. (Not offered in 1929-30.) Mr. Klaeber.
- 146f-147w. The Metrical Romances. The more important Middle English romances of the non-Arthurian cycles. Six credits. (Not offered in 1929-30.) Miss Carr.
- 148f-149w. Arthurian Romances. An introduction to the great stories of love and chivalry connected with King Arthur and the Round Table. Prerequisite: 8 credits above 50, including 75 or 81-82. Six credits. (Not offered in 1929-30.) Miss Carr.
- 150f. Victorian Poetry. The poetry of the Victorian era, aside from Brownings and Tennyson's. The principal names are: Matthew Arnold, the Rossettis, Fitzgerald, Morris, Swinburne, and Meredith. Prerequisite: 8 credits above 50. Four credits. (Not offered in 1929-30.) Mr. Stoll.

- 151s. Recent Poetry. Poetry in England and America since the death of Queen Victoria. The main tradition and tendencies now prevailing. Prerequisite: 8 credits above 50. Four credits. TWThF III; 204F. Mr. Beach.
- 152w-153s. Pre-Elizabethan Drama. The late medieval and the Renaissance drama, moralities, interludes, and farces up through the earlier years of the Elizabethan period. Prerequisite: 55-56. Six credits. TThS III; 302F. Mr. Bush.
- 154w-155s. The American Novel. The history of the American novel from the beginning to the present. Prerequisite: English 73-74. Six credits. MWF VI; 204F. Mr. McDowell.
- 156f. The American Drama. The pioneer work of Montrose Moses and Arthur Hobson Quinn. Prerequisite: 8 credits above 50, including 73-74. Three credits. MWF IV; 302F. Mr. Nichols.
- 157w-158s. Elizabethan Non-Dramatic Literature. A survey of prose and poetry, 1558-1603. Prerequisite: 8 credits above 50, including 51 or 70 or 55-56. Six credits. (Not offered in 1929-30.) Mr. Bush.
- 159s. Colonial Literature in America. Covers the period from 1608 to 1783. Prerequisite: 8 credits above 50, including 73-74. Three credits. MWF IV; 302F. Mr. Nichols.
- 160w. History of the English Language. Prerequisite: English 100. Two credits. (Not offered in 1929-30.) Mr. Klæber.
- 162f. Restoration Literature. Prerequisite: 8 credits above 50. Four credits. MTWF IV; 204F. Mr. Moore.
- 164s. Dante in English. See Italian 164s. Three credits.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f. Old English. Comparative study of Anglo-Saxon (Old English) grammar and reading of prose texts. Once a week, two hours. Three credits. Th VIII, IX. (Not offered in 1929-30.) Mr. Klæber.
- 202w-203s. Old English Poetry. Critical reading of poems. Once a week, two hours. Six credits. Th VIII, IX. (Not offered in 1929-30.) Mr. Klæber.
- 204f-205w-206s. Problems in Eighteenth-Century Literature. Nine credits. Th 4:00 to 6:00 p.m. Mr. Moore.
208. Piers the Plowman. A study of critical problems relating to the text and authorship. Three credits. (Not offered in 1929-30.)
- 209f-210w-211s. The Middle English Lyric. (Not offered in 1929-30.)
- 213f-214w-215s. Seminary in Eighteenth-Century Drama. Special attention will be given to the rise and progress of sentimental comedy and domestic tragedy. Nine credits. (Not offered in 1929-30.) Mr. Moore.
- 217f-218w-219s. Seminary in Restoration Drama. The drama from the Restoration to the rise of sentimental comedy. Special attention given to the comedy of manners (from Etherege to Farquhar) and its relation to the life of the time. Nine credits. (Not offered in 1929-30.) Mr. Stoll.

- 220f-221w-222s. Seminary in Medieval Drama. Nine credits. (Not offered in 1929-30.) Mr. Ruud.
- 225-226-227. Seminary in Elizabethan Drama. Elizabethan and Jacobean dramatists, from Lyly to Shirley. Problems assigned may involve Shakespeare, and in general his contemporaries will be studied less for their own sakes than for the light they shed upon him. Nine credits. (Not offered in 1929-30.) Mr. Stoll.
- 228-229-230. Seminary in Eighteenth-Century Novel. The rise and development of the novel as a form of literature; the use made of the novel as a medium of religious, social, and political theory. Nine credits. (Not offered in 1929-30.) Mr. Moore.
- 231f-232w-233s. Shakespeare's Tragic and Comic Art. Nine credits. M 4:00 to 6:00 p.m. (Not offered in 1929-30.) Mr. Stoll.
- 234f-235w-236s. Seminary in Middle English Alliterative Poetry. A literary and linguistic study of selected Middle English alliterative poems. Nine credits. (Not offered in 1929-30.) Mr. Ruud.
- 237f-238w-239s. Seminar in Chaucer. A study of some of the important problems in the Chaucer canon and in the works of Chaucer. Nine credits. W 4:00 to 6:00 p.m. Mr. Ruud.
- 240f-241w-242s. Seminary in the *Canterbury Tales*. Nine credits. (Not offered in 1929-30.) Mr. Ruud.
- 243f-244w-245s. Seminary in Non-Dramatic Literature of the Sixteenth Century. The Renaissance in England; prose and poetry, with special attention to Spenser and his contemporaries. Nine credits. F 4:00 to 6:00 p.m. Mr. Bush.
- 246f-247w-248s. Seminary in American Literature from 1783 to 1832. Nine credits. F 4:00 to 6:00 p.m. Mr. McDowell.
- 250f-251w-252s. Classical Backgrounds of Nineteenth-Century Literature. Classical influences upon poetry from Wordsworth to the present; the prose of Landor, Arnold, and others. Nine credits. (Not offered in 1929-30.) Mr. Bush.
- 253f-254w-255s. Studies in Hawthorne, Poe, and Emerson. Nine credits. (Not offered in 1929-30.) Mr. McDowell

For courses in Comparative Literature see page 44.

## COURSES IN COMPOSITION

### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 111f-112w-113s. Essay Writing. Practice in writing didactic, biographical, critical, and informal essays. Analysis of a considerable body of modern essays. Prerequisites: Courses 11-12 or 18-19, and 10 or 20. Nine credits. MWF III; 304F. Mr. Nichols.
- 119f-120w-121s. Seminar in Writing. Open to advanced students who write with facility and who desire personal direction. Criticism of manuscripts submitted. Prerequisites: 9 credits in senior college courses, and permission of instructor. Nine credits. Th VI, VII; 304F. Mrs. Phelan.

## ENTOMOLOGY AND ECONOMIC ZOOLOGY

Professors Royal N. Chapman, William A. Riley, Arthur G. Ruggles, Maurice C. Tanquary; Assistant Professors Maynard S. Johnson, Clarence E. Mickel, August L. Strand.

*Prerequisites.*—Eighteen credits in zoology and entomology.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 117w-118s-119su. General Ecology of Insects. General ecology with special reference to the insects of Minnesota. Frequent field trips. Lectures, laboratory, and field work. TTh V-VII; 208-210Z. Mr. Chapman.
- 124su. Advanced Ecology. Similar to 117-118-119 with special field work. Mr. Chapman.
- 125f-126w-127s. Advanced General Entomology. Morphology and classification of insects with lectures on the history of entomology. Lectures and laboratory. TThS III, IV; 208-210Z.
- 139-140. Histology and Development of Insects. Lectures and laboratory work on the histology, embryonic and postembryonic development of insects. Individual work along these lines is available to properly qualified students under Course 107. TTh II-IV, and arrange; 211Ad(F). Mr. Riley.
- 144f-145w-146s. Animal Parasites and Parasitism. Lectures and laboratory work. Second term devoted primarily to the relation of insects to diseases of man and animals. WF V-VII; 208-210Z. Mr. Riley.
160. General Forest Entomology. Lectures, laboratory, and library work treating of the life history, habits, and ecological relationships of insects that affect trees and forest products.
- 175f-176w-177s. Advanced Economic Entomology. A study of the principles of insect control, special studies of insecticides, and the history of economic entomology. Lectures and laboratory. Three credits per quarter. MWF I; 302Ad(F). Mr. Ruggles, Mr. Strand.
- 197f,w,s,su. Introduction to Research. Preparation for investigational work in lines of entomology, parasitology, ecology, or economic zoology. Summer work should be planned when possible. Mr. Chapman, ecology; Mr. Riley, parasitology, insect morphology; Mr. Ruggles, general economic entomology; Mr. Tanquary, apiculture; Mr. Johnson, economic vertebrate zoology; Mr. Mickel, systematic entomology; Mr. Strand, insecticides.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201-204. Research in Entomology. Mr. Chapman, Mr. Riley, Mr. Mickel.
- 205-208. Research in Economic Entomology. Mr. Ruggles.
- 209-212. Research in Economic Vertebrate Zoology. Mr. Johnson.
- 261-264. Research in Parasitology and Medical Entomology. Mr. Riley.
- 265-268. Research in Insecticides. Mr. Strand.
- 269-272. Research in Apiculture. Mr. Tanquary.

## FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

For courses and staff see Economics.

## FORESTRY

Professors Henry Schmitz, John H. Allison, Edward G. Cheyney, Raphael Zon; Associate Professor John P. Wentling; Assistant Professor Thorald S. Hansen.

*Prerequisites.*—For major work, 27 credits in forestry, three quarters of botany or equivalent. For minor work, 9 credits in the department.

Exemptions from the language requirement for the Master's degree may be made in individual cases.

The choice in subject must be made by the candidate and approved by the chief of the division and instructor. The facilities of the forest experiment stations at Cloquet and Itasca are available to students taking this work.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101w. Advanced Dendrology. A continuation of Course 3-4 with special studies in classification and distribution of the timber species of the world. *Prerequisites:* 10 credits in botany and 8 credits in dendrology. Three credits. TThS I; 301Hr(F). Mr. Wentling.
- 107f. Uses of Wood I. The economic hard and soft woods, both foreign and domestic from the standpoint of regions of production, distribution centers, qualities, amounts, and prices in relation to the wood-using industries. Lectures, reading, reports. *Prerequisite:* Course 33-34. Three credits. MWF IV; 301Hr(F). Mr. Wentling.
- 108w. Uses of Wood II. A continuation of Course 107 dealing with the industries and the woods they use. Kinds, grades, qualities, properties, requirements for each product. Use, re-use, distribution of product. Regions of production and relation to other industries. Lectures, readings, reports. *Prerequisite:* Course 33-34. Three credits. MWF IV; 303Hr(F). Mr. Wentling.
- 109s. Uses of Wood III. The actual use of wood in the industries. At least six hours per week must be spent in actual study in a factory. Complete reports and collateral readings. *Prerequisites:* Courses 107 and 108. Three credits. TTh VI, VII, VIII; 303Hr(F). Mr. Wentling.
- 112w. Advanced Forest Mensuration. Continuation of Course 10 with special emphasis on tree forms, the development of the formula used in study of volume and growth of trees. Ar. Mr. Hansen.
- 113f. Wood Pulps and Papers. A detailed study of production of wood pulp and paper products. Lectures, reading, reports. *Prerequisites:* Course 33-34, Chem. 3 or 10 and Chem. 36. Three credits. Juniors and seniors. Ar. 302Hr(F). Mr. Allison.

- 114f-115w-116s. Mechanical and Physical Properties of Wood. Study of strength as related to density, quality, etc. Wood stresses, failures, and methods of testing timbers. Prerequisite: Course 33-34. Nine credits. TThS I, II; 303Hr(F). Mr. Wentling.
- 119w. Advanced Wood Structure I. A detailed study of the elements and structure of native and foreign economic woods. Preparation, sectioning, and mounting of typical sections. Reference reading and reports. Six hours per week. Prerequisite: Course 33-34. Three credits. TTh VI, VII, VIII; 303Hr(F). Mr. Wentling.
- 120s. Advanced Wood Structure II. Study of wood structure in relation to seasoning, mechanical failures, penetration or preservatives, variation in strength, etc. Six hours per week. Prerequisite: Course 33-34. Three credits. WF VI, VII, VIII; 303Hr(F). Mr. Wentling.
- 125s. Wood Preservation. Lectures and collateral reading upon the history, development, and methods of wood preservation. Different systems now in use and preservatives used. MWF IV; 301Hr(F). Mr. Schmitz.
- 126f. Silvics. The fundamentals forming the basis of silviculture with special attention to the silvics of the important tree species. Lectures, readings, and required papers. TThS IV; 301Hr(F). Mr. Cheyney.
- 127w. Silviculture. A study of the general principles underlying the art of silviculture, and a brief study of the European methods as applied to American conditions. TThS III; 301Hr(F). Mr. Cheyney.
- 128s. Silvicultural Laboratory. Nursery practice and field planting. Field investigations and planting plans. Seed collecting, extracting, and storing. Dairy nursery and field work. Cloquet Forest Experiment Station. Mr. Cheyney.
- 129f. American Silvicultural Practice. A study of the silvicultural methods now being employed in the United States and the probable results of the application of other European methods. Lectures, references, and discussion. Three credits. TThS III; 301Hr(F). Mr. Cheyney.
- 130f. Forest Valuation. The business of forest management. A study of the different factors entering into the valuation of forest property. MTWThF I; 301Hr(F). Mr. Allison.
- 131w. Forest Policy and Administration. The policy of the United States and the states toward the utilization of the public forest resources. Policy of other owners toward forest resources controlled by them. Administration of the national and state forests. MTWFS IV; 302Hr(F). Mr. Allison.
- 132s. Forest Regulation Laboratory. Field work. The collection of the data necessary to work up a forest working plan. Includes the making of the timber estimates, growth studies, and maps necessary to a forest working plan. Cloquet Forest Experiment Station. Mr. Allison.
- 136f. Forest Economics. The place of the forest in the productive utilization of land; past and present markets and source of supply of timber and timber products, particularly with reference to the present situation in North America. MWF II; 201So(F). Mr. Allison.



## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201-202. Research Problems in Science and Practice of Silviculture. Mr. Cheyney.
- 203-204. Research Problems in Forest Management and Working Plans. Mr. Allison.
- 205-206. Research Problems in Forest Economics. Mr. Allison.
- 207f-208w-209s. Research in Wood Technology. Mr. Wentling.
- 210f-211w-212s. Special Problems in Forest Research and Research Methods. Mr. Zon.
- 213f-214w-215s. Special Problems in Forest Utilization. Mr. Schmitz, Mr. Wentling.
- 216f-217w. Forest Seminar. Mr. Zon.

## GEOGRAPHY

Professor Darrell H. Davis; Assistant Professor Richard Hartshorne.

*Prerequisites.*—For major work, Courses 1-2 or 11, 41, and 5 additional credits in geography, Economics 6-7, and Geology 1 or 8. For minor work, 10 credits in the department.

Exemptions from the language requirement for the Master's degree may be made in individual cases.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101s. Geography of Europe. A study of the various European countries and their economic development. Prerequisite: 20 credits in social science, to include 10 credits in geography. Three credits. TThS II; 105OL. Mr. Dicken.
- 102s. Trade Routes and Trade Centers. A study of the major land and ocean routes, ports and interior trade centers, and the nature and significance of the traffic. Prerequisite: Course 41. Three credits. TThS II; 103OL. Mr. Hartshorne.
- 110w. Geography of South America. A study of the major geographic regions of South America, with emphasis upon the economic activities and their geographic basis. Prerequisite: 20 credits in social science, to include 11 or 41. Three credits. TThS I; 103OL. Mr. Brown.
- 111s. Cartography. The construction and use of maps and graphs. Prerequisite: 10 credits in senior college work in geography, geology, history, or other subject in which the use of maps is necessary. Three credits. MWF III; 105OL. Mr. Hartshorne.
- 120w. Geography of Asia. Areal differentiation in the major geographic regions of Asia. Special consideration of China, Japan, and India. Prerequisite: 20 credits in social science, to include 11 or 41. Three credits. MWF III; 105OL. Mr. Davis.
- 133s. Climatology. Weather and climate in their relation to man and his activities. Prerequisite: Course 11. Three credits. TThS IV; 105OL. Mr. Brown.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 235s. Geography of Minnesota. A regional economic study of the state. The basis for existing industry and city development will receive special consideration. Prerequisite: 12 credits in geography, or 20 credits in social science to include at least 9 credits in geography. Permission of instructor necessary. Three credits. MWF I; 105OL. Mr. Davis.
- 241f,s. Field Course in Geography. A consideration of the problems of field work, illustrated by field trips. Prerequisite: 18 credits in geography. Three credits. Hours arranged. (Not offered in 1929-30.) Mr. Davis.
- 251f-252w-253s. Seminar in Geography. A survey of current literature with reports and discussion on assigned topics. Prerequisite: 20 credits in geography or permission of instructor. Three credits. Th VII; 105OL. Mr. Davis and staff.
- 301f,w,s. Research Problems in Geography. Credits and hours arranged. Mr. Davis.

## GEOLOGY AND MINERALOGY

Professors William H. Emmons, Frank F. Grout, Clinton R. Stauffer; Associate Professors John W. Gruner, George M. Schwartz, George A. Thiel.

*Prerequisites.*—For major work in:

General geology and economic geology. Courses 1, 2, or 3; a knowledge of general chemistry. Course 105 must be carried along with other graduate work.

Petrology. Courses 1, 3, elementary chemistry and physics.

Paleontology. Courses 1, 11, or 91-92-93. Zoology is a desirable antecedent.

A student selecting some branch of geology as a major will not be allowed to select general geology as a minor.

Exemptions from the language requirements for the Master's degree may be made in individual cases. Students who are deficient in modern languages are advised to take a language along with their graduate work. Examinations in French and German are required of candidates for service on the United States Geological Survey.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f. Principles of Stratigraphy. Origin and structure of sedimentary deposits; the interpretation of these in relation to paleogeography; field work in connection with Cambrian and Ordovician problems. Ar. Three credits.
- 102w-103s. Micropaleontology. The study and classification of Foraminifera, diatoms, and other small fossil organisms and their use for purposes of correlation in oil fields. Three credit hours of laboratory work. Hours arranged. Winter and spring quarters. Open to students who have had Geology 11 or 91. Mr. Stauffer.

- 105f.** Elements of Rock Study. Prerequisite: Course 22 or 25. Three credits. TTh VI, VII; 110P. Mr. Grout.
- 106w.** Petrography. The identification and study of minerals and rocks by tropical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. Prerequisite: Course 105. Three credits. MF VII, VIII; 110P. Mr. Grout.
- 107f-108w-109s.** Paleontologic Practice. The collection, preparation, and study of materials, with a view to gaining a working knowledge of groups of fossils, and the use of literature. Prerequisite: Course 59. Nine credits. MWF V, VII; 105P. Mr. Stauffer.
- 111f.** 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. Prerequisites: Courses 10, 105. Three credits. TThS I; 110P. Mr. Emmons.
- 112w.** Geology of Petroleum. The first part treats of deposits of metals, giving special attention to those outside of the United States. The second half deals with the nature, origin, and distribution of petroleum and with the various oil fields of the world. Prerequisite: Course 111. Three credits. TThS I; 110P. Mr. Emmons.
- 113s.** Problems in Ore Deposits. Field excursions, map work, lectures on field and laboratory methods. Prerequisite: Course 112. Three credits. Th VI-IX; 110P. Mr. Emmons.
- 121f.** Crystallography. The symmetry relations in the thirty-two crystal classes. Crystal drawings and measurements. Projections and mathematical calculations. Prerequisites: Mathematics 7 and elementary inorganic chemistry. Three credits. Hours as.; 100P. Mr. Gruner.
- 124w-125s.** Structural and Metamorphic Geology. The conditions, processes, and results of metamorphism; structural features resulting from deformation under varying conditions of load. Prerequisites: Courses 9 or 10, 105. Six credits. MWF VI; 208P. Mr. Schwartz.
- 127f.** Geology of the Lake Superior Region. Structure and correlation of districts. Interpretation of field notes and survey reports. Practical problems. The use of geologic bibliographies and literature. Prerequisites: 124-125. Three credits. Hours arranged. Mr. Thiel.
- 131f-132w-133s.** Advanced Petrology. Advanced optical methods. Regional and genetic studies. Petrographic reports. Prerequisite: Course 105. Nine credits. TThS II-III; 200P. Mr. Grout.
- 137w.** Testing Economic Minerals. Laboratory tests of coal, clay, oil, building stone, and metallic ores. Prerequisites: Courses 1, 105. Three credits. MT VI-VIII; 200P. Mr. Grout.
- 140w-141s.** Applied Petrography. Determination of ore and gangue minerals, microscopic studies of paragenesis of ores and other mineral associations. Practical problems in mining and geology, settled by microscopic and optical examination. Prerequisite: Course 131. Six credits. MW I; MWF II; 200P. Mr. Grout, Mr. Gruner.
- 144w-145s.** Construction and Interpretation of Geologic Maps. Methods of geological examination; study and problems in construction and

- interpretation of geologic maps. Prerequisite: Courses 9 or 10. Six credits. TTh VII-IX.
- 149s. Methods of Field Geology. General methods of field work necessary for Course 150. Mr. Schwartz.
- 150s. Field Geology. Detailed, systematic work, conforming to official surveys. Reports to be written week before college opens. For prerequisites see members of the department. Credits arranged. Mr. Emmons, Mr. Schwartz.
- 151f-152w-153s. Advanced General Geology. Geologic processes and their results; development of the North American continent. Prerequisite: Course 9. Nine credits. MWF III; 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. Prerequisites: Course 121, elementary physics, and analytical geometry. Three credits. Hours ar. 100P. Mr. Gruner.
- 166f-167w. Mineralography. Methods of studying opaque minerals and application of the methods to problems in ore genesis and history. Prerequisite: Course 111. Six credits. Hours arranged. 207P. Mr. Schwartz.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 211f-212w-213s. Advanced Paleontology. Selected groups of fossils. Class work supplemented by reference reading and thesis. Three credits. Mr. Stauffer.
214. Seminar in Ore Deposits. Three credits. Mr. Emmons.
- 215s. Geology and Ore Deposits of the Western Hemisphere. Open to graduate students and to those undergraduates who have had Course 111. Three credits. Mr. Emmons.
- 216s. Geology and Ore Deposits of the Eastern Hemisphere. Prerequisites same as for Course 215. Three credits. Mr. Emmons.
220. Glacial Geology. The drift sheets, glacial lakes, the gorge of St. Anthony Falls, the dalles of the St. Croix, and other problems. Lectures, reference reading, and field work. Hours arranged.
241. Field Course in Geology. To be arranged with individual students upon application to the department. Credit will be given for field work done satisfactorily as prescribed in the joint announcement of various universities.
- 243-244. Research Course in Geology. Advanced work in general geology; chiefly individual work on selected subjects. Data and collections of material gathered in the course of field work studied under instructor. Methods follow standards of federal and state surveys. Mr. Emmons, Mr. Grout, Mr. Stauffer.
246. Pre-Cambrian Geology. The problems of pre-Cambrian correlation and structure; the pre-Cambrian stratigraphy of North America. Given in alternate years. Three credits.
- 251-252. Original Problems. Morphology and physical measurements of minerals. Three credits each. Mr. Gruner.

- 253-254. Research Course in Ore Deposits. Methods of Course 243-244 applied to ore deposits. Three credits each. Mr. Emmons, Mr. Grout, Mr. Gruner, Mr. Schwartz.
- 263-264. Research Course in Petrology. Methods of Course 243-244 applied to petrology. Three credits each. Mr. Emmons, Mr. Grout.

## GERMAN

Professors Samuel Kroesch, Oscar C. Burkhard, Frederick Klaeber<sup>1</sup> (Comparative Philology); Associate Professor George Lussky; Assistant Professor James Davies.

*Prerequisites.*—For major work, 27 senior college quarter credits or equivalent. For minor work, 18 senior college credits or equivalent.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 107f. Historical German Grammar. Phonology, inflection, word formation, syntax. Intended primarily for prospective teachers of German. Three credits. (Not offered in 1929-30.) Mr. Kroesch.
- 108s. Comparative Phonetics. A study of speech sounds and the nature of their production, with special reference to English, French, and German. Open to students in the modern languages. Three credits. MWF III; 209½F. Mr. Kroesch.
- 109f-110w-111s. History of the German Language. Lectures, discussions, assigned readings. This course is identical with Comparative Philology 109-110-111. Nine credits. (Offered in 1930-31.) Mr. Klaeber.
- 115-116-117. Middle High German Literature. The Niebelungen Lied, Court Epic, Minnesang. Nine credits. Th VI, VII, VIII. (Offered in 1929-30.) Mr. Kroesch.
- 140-141-142. Early High German Literature, 1500-1700. German literature from the Reformation and the Renaissance to the beginning of the modern High German classical period. Nine credits. T VII. (Not offered in 1929-30.) Mr. Lussky.
- 143f-144w-145s. The Classical Period. From Gottsched through Goethe. Nine credits. W VI, VII, VIII. (Offered in 1929-30.) Mr. Lussky.
- 150f-151w-152s. Die Novelle. A study of the technique and development. Assigned readings and reports. Nine credits. (Not offered in 1929-30.) Mr. Burkhard.
- 153f-154w-155s. Studies in German Literature of the Nineteenth Century. Subject for 1929-30, Kleist, Grillparzer, Hebbel. Nine credits. T VI, VII, VIII; ar. Mr. Burkhard.
- 160f-161w-162s. Lyric Poetry of the Eighteenth and Nineteenth Centuries. Nine credits. M VI, VII, VIII; 209F. (Not offered in 1929-30.) Mr. Davies.
- 163-164-165. German and English Literary Relations in the Sixteenth, Seventeenth, and Eighteenth Centuries. Nine credits. M VI, VII, VIII; 211F. (Offered in 1929-30.) Mr. Davies.
- 170-171-172. Young Germany: Gutzkow, Immermann, Heine. F VI, VII, VIII. Mr. Pfeiffer.

173-174-175. Modern Novel: Thomas Mann, Heinrich Mann, Ricarda Huch.  
F VI, VII, VIII. Mr. Pfeiffer.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

For description of the following courses see the statement of the Department of Comparative Philology.

202-203. Gothic. Mr. Klaeber.

205. Urgermanische Grammatik. Mr. Klaeber.

206-207-208. Old Saxon. Mr. Klaeber.

209-210-211. Old High German. Mr. Klaeber.

215f-216w-217s. Middle High German. Phonology, morphology, and syntax. Nine credits. MWF VI. Ar. (Offered in 1930-31.) Mr. Kroesch.

#### GREEK

Professor Charles Albert Savage.

*Prerequisites.*—For major work, Courses 105, 106 or 107, 108, or their equivalent. For minor work, Courses 51 (Philosophy), 52 (Oratory), 53 (Dramatic Poetry), or their equivalent.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105f. Lyric Poetry. Selections from the elegiac, iambic, lyric, and bucolic poets. Three times a week. Prerequisites: Greek 51 and 53 or 52 and 53. Three credits. Ar. 112F. Mr. Savage.

106w. Advanced Drama. Aeschylus, Sophocles, or Aristophanes. Special attention given to the development of the drama, and to the literary form and dramatic representation of the plays read. Three times a week. Prerequisite: Greek 53 or 105 or equivalent. Three credits. Ar. 112F. Mr. Savage.

107w. Advanced Prose. Selections from Plutarch or Lucian. Alternates with Course 106. Equivalent prerequisites. Ar. 112F. Mr. Savage.

108s. Advanced Epic Poetry. A course of rapid reading in the *Iliad* or the *Odyssey*. Three times a week. Prerequisite: Greek 105 or 106. Three credits. Ar. 112F. Mr. Savage.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202-203. Oratory (advanced). A study of the development of oratorical style among the Greeks; selected readings. Twice weekly, one, two, or three quarters. Mr. Savage.

204-205-206. Dramatic Poetry (advanced). The reading and critical study of representative Greek plays. Twice weekly, one, two, or three quarters. Alternates with 201-202-203. Mr. Savage.

207-208-209. Seminar in Philosophy or Oratory. Once a week, one, two, or three quarters. Mr. Savage.

210-211-212. History (advanced). Selected readings from Greek historians. Once a week, one, two, or three quarters. Alternates with 207-208-209. Mr. Savage.

## HISTORY

Professors Guy Stanton Ford, Solon J. Buck, Herbert Heaton, August Charles Krey, Lester Burrell Shippee, Albert Beebe White; Associate Professors Theodore C. Blegen, George M. Stephenson; Assistant Professors Harold Deutsch, William McDonald, Ernest Osgood, Lawrence D. Steefel,<sup>1</sup> Faith Thompson, Alice F. Tyler; Instructor David H. Willson.

*Prerequisites.*—Of the four fields in which general survey courses in history are usually given, namely, ancient, American, English, and European, students entering upon graduate work in history will usually be expected to have covered two or three courses, with credit not exceeding 18 hours. For the other 9 hours, they should have a more advanced course in one of these fields and a second course in some field of history in which intensive work is done with the beginnings of investigation. In meeting these requirements consideration will be given to work done from the historical point of view in others of the social sciences, especially political science. The department attaches considerable importance to adequate preparation in the foreign languages, which may be used by the student in the course of advanced and research work. An especially good equipment here will be taken into consideration in weighing the student's preparation for graduate work.

## REQUIREMENTS FOR THE PH.D. IN HISTORY

Candidates will be expected to fulfil the general requirements as given in this bulletin, pp. 15-19.

*Preliminary Examination*

For a major in history, the candidate shall choose five fields from those listed below. At least one period or field shall be chosen from groups A or B and at least one from groups C or D. Three of these fields, including that containing the subject of the proposed thesis must be related. The selection of these fields must be made in consultation with and subject to the approval of the chairman of the candidate's examination committee. These selections shall be reported by the adviser to the chairman of the History Department. In exceptional cases, the department may approve fields not included in the list.

The preliminary examination will cover the minor and four of the periods or fields chosen for the major. That field in which the candidate intends to do special work shall be reserved for the final examination. The scope of this reserved field shall be notified to the department and approved by it at the time when the candidate is certified for the preliminary examination. Only in exceptional cases shall it cover less than one of the five fields selected from the following list:

<sup>1</sup> Absent on leave, 1929-30.

*Group A*

1. The Old Orient
2. Greece
3. Rome

*Group B*

1. Europe, 395-1300
2. England to 1485
3. Renaissance and Reformation
4. Economic History, 1300-1600

*Group C*

1. England since 1485
2. Europe, 1559-1789
3. Europe, 1789 to Present
4. Economic History, 1600 to Present

*Group D*

1. The United States to 1789
2. The United States, 1789-1865
3. The United States since 1865
4. Economic History of the U. S.,  
1790-1860
5. Economic History of the U. S.  
since 1860

*Group E*

1. Asia since 476
2. European Colonies and Depend-  
encies
3. Latin America

*Final Examination*

In this examination, taken after the successful completion of the preliminary examination and the acceptance of the candidate's thesis, the emphasis shall be placed upon testing the highly detailed knowledge of the student in his special subject. It shall cover that subject reserved in the preliminary examination and under the rules of the Graduate School is given by the same committee that sat in the preliminary examination. This examination includes the usual defense of the thesis, its methods, results and contribution to the field investigated.

## GENERAL REQUIREMENT

201f-202w-203s. Historical Bibliography and Criticism. Required of candidates for advanced degrees in history who do not present evidence of similar training elsewhere. F VIII; 328Lib. Mr. Ford, Mr. White, and others.

## AMERICAN HISTORY

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 112s. History of American Immigration. Settlement and development of typical racial stocks in America. Contributions of European immigrants to American life. Attention to political history. Prerequisites: 20 credits in social science or 15 credits in history. Three credits. MWF VI; 211OL. Mr. Stephenson.
122. American Colonies in the Seventeenth Century. Prerequisites: 20 credits in social science or 15 credits in history. Five credits. (Not offered in 1929-30.) Mr. White.
- 125f-126w.† American Diplomatic History. Prerequisites: 20 credits in history and political science or 15 in history or political science. Six credits. MWF III; 211OL. Mr. Shippee.
- 129s. The Civil War and Reconstruction. Prerequisites: 15 credits in history, including History 7-8. Three credits. MWF II; 211OL. Mrs. Tyler.
- 141f. The West in American History to 1815. Prerequisites: History 7-8 and 10 credits in social science or 5 credits in history. Three credits. TThS III; 211OL. Mr. Buck.



- 142w. The West in American History, 1815-1855. Prerequisites: see History 141. Three credits. TThS III; 211OL. Mr. Shippee.
- 143s. The West in American History since 1855. Prerequisites: see History 141. Three credits. TThS III; 15F. Mr. Buck.
- 144w. American Political Parties. Prerequisites: 20 credits in social science or 15 credits in history, including 7-8 or equiv. Three credits. MWF II; 221OL. Mr. Stephenson.
- 149s. American Colonies in the Eighteenth Century. Prerequisites: 20 credits in social science or 15 credits in history. Five credits. MTThFS II; 102F. Mr. Osgood.
152. Select Topics, The West to 1815. Prerequisites: 20 credits in history, including 7-8. Five credits. (Not offered in 1929-30.) Mr. Buck.
153. Select Topics, The West since 1865. Prerequisites: 20 credits in history, including 7-8. Five credits. (Not offered in 1929-30.) Mr. Buck.
- 154w. Select Topics, History of Minnesota. Students taking this course are expected to do a portion of their work in the library of the Minnesota Historical Society. Prerequisites: 20 credits in history, including 7-8. Five credits. WF VI, VII. Ar. Mr. Blegen.
156. United States Reconstruction. Prerequisites: 20 credits in history, including 7-8. Five credits. (Not offered in 1929-30.) Mr. Shippee.
- 166f. Select Topics, History of Immigration. Prerequisites: 20 credits in history and consent of instructor. Five credits. MW VIII, IX; 315Lib. Mr. Stephenson.
- 168s. Select Topics, American Foreign Relations. Prerequisites: 20 credits in history, including History 9, or 20 credits in political science, French or German, and consent of instructor. Five credits. TTh VIII, IX; 339Lib. Mr. Shippee.
- 171f. Select Topics in Recent American History. Prerequisites: 20 credits in history, including History 9. WF VI, VII; 315Lib. Mr. Blegen.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 206f-208w-210s.† Seminar in American History. Required of graduate students whose major field is American history. The first term will be principally occupied with bibliographical and technical topics. Selected fields in American history will be studied in other terms. Nine credits. S III, IV; 301OL. Mr. Buck, Mr. Shippee, Mr. Blegen, Mr. Stephenson.
- 231f-232w-233s.† Seminar in American Life. A study of a series of aspects of American life. Six credits. W IX, X. Ar. Consult Mr. Shippee, Mr. McDowell (English), or Mr. Osgood.

See also History 113-114-115 under Economic History, History 121 under English History, and History 111 under European History.

## ANCIENT HISTORY

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 103f. Political History of Greece. With special reference to the reaction upon cultural progress. Prerequisites: 20 credits in social science or 15 credits in history, or major in Greek or Latin. Five credits. MTWFS IV; 112OL. Mr. McDonald.

- 105w. History of Rome. Prerequisites: 20 credits in social science or 15 credits in history, or major in Greek or Latin. Five credits. MTWFS IV; 112OL. Mr. McDonald.
- 133f. Ancient Civilization of the Near East: Egypt, Mesopotamia, Israel, and neighboring lands. Archeological discovery and history. Prerequisites: 20 credits in social science or 15 credits in history. Three credits. MTW VI; 111OL. Mr. McDonald.
- 134w. Ancient Civilization: Greek and Roman I. A comparative study of social life, thought, and religion. Prerequisites: 20 credits in social science, including History 103 or 105, or equivalent, or major in Greek or Latin and consent of instructor. Three credits. MTW VI; 111OL. Mr. McDonald.
- 135s. Ancient Civilization: Greek and Roman II. Economic aspects: agriculture, manufactures, commerce, slavery. Towns and public works. Ancient exploration, trade routes, travel, and colonization. Prerequisites: 20 credits in social science, including History 103 or 105, or equivalent, or major in Greek or Latin and consent of instructor. Three credits. MTW VI; 111OL. Mr. McDonald.

### ECONOMIC HISTORY

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 113-114-115.§ Economic History of Europe since 1750. Prerequisite: 20 credits in social science. Nine credits. (Not offered in 1929-30.) Mr. Heaton.
- 116f-117w-118s.§ Economic History of Europe, 1300-1750. Prerequisite: 20 credits in social science. Nine credits. TThS II; 221OL. Mr. Heaton.
- 169s. Select Topics in Economic History. Prerequisite: 20 credits in social science. Three credits. TThS III; 211OL. Mr. Heaton.

#### COURSE PRIMARILY FOR GRADUATE STUDENTS

- 221f-222w-223s.† Seminar in Economic History. Nine credits. (Not offered in 1929-30.) Mr. Heaton.

### ENGLISH HISTORY

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 121w. English Backgrounds and American Colonization. Prerequisite: 20 credits in history or political science. Five credits. MWThFS II; 209OL. Mr. White.
162. Beginnings of Parliament. From the Norman Conquest to the reign of Edward I, based wholly on original sources. Prerequisites: 20 credits in history, including History 4-5; knowledge of high school Latin. Maximum of five credits. (Not offered in 1929-30.) Mr. White.
- 183s. Stuart Period. Prerequisites: 20 credits in history, including 4-5. Five credits. MW VIII, IX; 328Lib. Mr. Willson.
- 184s. Topics in Modern English History. Prerequisite: 20 credits in history. Five credits. TTh VIII, IX; 315Lib. Mr. Willson.

See also courses in Economic History.

§ With the permission of the instructor, a student may enter the second or third quarter.

## THE FAR EAST

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 136-137.† Far Eastern Government and Politics. (Not offered in 1929-30.)  
(See Political Science 153-154.)
- 138-139.† Far Eastern Diplomacy. (See Political Science 191-192.)

See also Political Science 193s. Problems of the Pacific.

## EUROPEAN HISTORY

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w.† The French Revolution: Napoleonic Era. Prerequisites: 15 credits in history or 20 credits in social science, including 10 credits in history. Reading knowledge of French desirable. TThS I; 111OL. Mr. Deutsch.
104. The Near East: Modern. Rise and decline of the Ottoman Empire; development of the Balkan states; action of the great powers in the Near East. Prerequisites: 20 credits in social science, including History 1-2. Three credits. (Not offered in 1929-30.) Mr. Steefel.
- 106f-107w-108s.§. Europe, 1815-1914. Prerequisites: 15 credits in history or 20 credits in social science. A reading knowledge of French and German desirable. Nine credits. MWF VII; 111OL. Mr. Deutsch, Mr. Steefel.
- 111w. European Background of American Immigration. Prerequisites: 20 credits in social science or 15 credits in history. Three credits. MWF VI; 101F. Mr. Stephenson.
- 119s. The Renaissance and Reformation. Especial emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. Prerequisite: 15 credits in history. Five credits. MTWThF III; 112OL. Mr. Krey.
- 120f. Medieval Civilization. A study of the social and intellectual development of Europe from the period of the German migration to the end of the thirteenth century. Prerequisite: 15 credits in history. Five credits. MTWThF III; 112OL. Mr. Krey.
- 123f. European Expansion to 1815. Period of the great discoveries. Foundation of the European empire in America, Asia, and Africa. The old colonial system. The struggle for empire. Prerequisites: 20 credits in social science or 15 credits in history. Three credits. MWF IV; 111OL. Mr. Willson.
- 124w. European Expansion since 1815. Expansion and development of British dominion in India. Russian expansion in Central Asia and Siberia. The partition of Africa. Imperialism and the reaction of the non-European peoples. Prerequisites: see History 123f. Three credits. MWF IV; 111OL. Mr. Willson.
127. Feudal Institutions. Prerequisite: 15 credits in history. Five credits. (Not offered in 1929-30.) Mr. Krey.
- 128w. Rise of Nationalism in Europe. A study of the growth of central government and the influence which led to the formation of nations to 1600. Chief attention to France. Prerequisite: 15 credits in history. Five credits. MTThFS III; 213F. Mr. Krey.

130. Introduction to the History of Russia. Survey of the history of the Russian people and the development of the Russian state. As far as time permits attention will be paid to foreign affairs and to the development of Poland. Reading knowledge of French and German desired. Prerequisites: 20 credits in social science, including History 1-2, 14-15-16, or 17. Three credits. (Not offered in 1929-30.) Mr. Steefel.
- 131-132. France under Louis XIV and Louis XV. Prerequisites: 15 credits in history or 20 credits in social science, including 10 credits in history. Six credits. (Not offered in 1929-30.)
- 157-158-159.\* Topics in Modern European History. Prerequisites: 20 credits in history, including History 106-107-108, or History 101-102, French or German and consent of instructor. Fifteen credits. (Not offered in 1929-30.) Mr. Steefel.
164. Studies in the Crusades. Prerequisites: 20 credits in history, knowledge of high school Latin, and consent of instructor. Five credits. (Not offered in 1929-30.) Mr. Krey.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 204f-205w-206s.† Seminar in Medieval History. Nine credits. Ar. Mr. Heaton, Mr. Krey, Mr. White.
- 224f-225w-226s.† Seminar in Modern European History. Six credits. Th VIII-IX. Mr. Deutsch, Mr. Steefel.

See also Political Science 153-154 and 191-192.

#### HOME ECONOMICS

Professor Wylle B. McNeal;<sup>1</sup> Associate Professors Alice Biester, Clara M. Brown, Alice M. Child, Harriet Goldstein, Jane Leichsenring; Assistant Professor Ethel Phelps.

*Prerequisites.*—For major work, credits in chemistry, botany, bacteriology, and human physiology, economics, etc., satisfactory to the instructor with whom the student wishes to work. In addition each student must have had elementary courses in that field of home economics in which she wishes to specialize. The undergraduate subject-matter courses must be satisfactory to the adviser under whose direction the major work is done.

For a minor, the prerequisites to the courses to be pursued must be met. The minor sequence should be arranged with a graduate adviser of the field in which the student proposes to work.

Students majoring in Home Economics for a Master's or Doctor's degree, and those minoring in this division for the Doctor's degree must include Course 299 in the study program.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 102f,s. Advanced Textiles. An intensive study of textile materials with special reference to the following: nature of the raw materials; economic, chemical, and physical applications involved in their manufacture and use; methods and significance of physical testing. Prerequisites: Textiles 5 cred., Org. Chem. 5 or 6 cred., Principles of Economics 5

\* Students may enter any quarter.

<sup>1</sup> Absent on leave, 1929-30.

- cred., or parallel. Three credits. TTh VI, VII, VIII; 307-311HE. Miss Phelps.
- 107w. Textile Analysis and Related Problems. Problems and application of quantitative methods in textile analysis with special reference to establishing standards for fabrics. Prerequisites: Course 102, Agr. Biochem. 2. Three credits. MWF VI, VII, VIII; 311HE. Miss Phelps.
- 115f,w. Clothing Economics. A study of the economic aspects of clothing which directly or indirectly affect the consumer. Prerequisites: Course 13, Agr. Econ. 1. Two credits. TTh III; 203HE. Miss Weller.
- 131f,w,s. Home Management: House Planning and Equipment. Study of the small house which aims at more intelligent planning in building and furnishing. House plans, kitchen arrangements, and equipment of house studied from homemaker's point of view of economy, convenience, and beauty. Prerequisite: Course 53. Five credits. Fall, MTWFS III, IV; winter, MTWThF VI, VII; spring, Sec. 1, MTWFS III, IV; Sec. 2, MTWThF VI, VII; 401HE. Miss Morse.
- 136s. Problems of Income Management. An intensive study of problems relating to individual and family budgets. Readings, discussions, and field work. Prerequisites: Courses 34, 35, 170, Agr. Econ. 126 or parallel. Three credits. MWF VIII. Miss Studley.
- 150f,w,s. Art History and Appreciation. The historical development of painting, sculpture, architecture, decoration, furniture, and costumes, studied with special emphasis on design and influence upon modern styles. Prerequisite: Course 51 or equivalent. Three credits. MWF VIII; 313HE. Miss H. Goldstein.
- 152w. Advanced Interior Design. Special problems of small house decoration will be studied. Elevation drawings made. Actual materials will be used as far as possible. Prerequisites: Courses 53, 131, 150. Three credits. MWF I, II; 401HE. Miss Morse.
- 154s. Advanced Costume Design. A study of figure construction; line, color, and textures for beautiful arrangements and with reference to individual types. Laboratory work with fabrics and designs carried out in pencil and water colors. Prerequisites: Courses 13, 53, 55 recommended. Three credits. TThS I, II; 401HE. Miss H. Goldstein.
- 163s. Institution Management Problems. Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. Field trips to various types of institutions. Prerequisites: Courses 61, 63. Three credits. Lect., TTh III; 106HE.; lab., S III, IV; DiH. Miss Dunning.
- 170f,w,s. Nutrition of the Family. The fundamental principles of human nutrition as applied to the feeding of individuals and groups under conditions of health, and under such pathological conditions as are chiefly dependent upon dietetic treatment. Prerequisites: Courses 80 or 81, Agr. Biochem. 4, Physiol. 4. Three credits. Fall and spring, Sec. 1, MWF I; Sec. 2, MWF IV; winter, MWF I; 203HE. Miss Biester, Miss Hunt.

- 171f,w,s. Child Nutrition. Lectures, discussions, and field work dealing with the principles of child nutrition and with the formation of desired food habits. Prerequisites: Course 170, H.E.Ed. 40. Three credits. Lect., MW III, F III, IV; lab., IV, day to be arranged before completing registration; 213HE. Miss Leichsenring.
- 173s. Nutrition in Disease. A study of the fundamental principles involved in using diet in the treatment of certain diseases. Prerequisites: Courses 170, 175. Three credits. Lect., MWF VII; 213HE. Miss Hunt.
- 175f,w. Nutrition II. Metabolism including work on tissues, blood, milk, and urine. Prerequisite: Course 73. Four credits. Fall, MTWTh I, II; winter, MWF VI, VII, VIII; 211, 213HE. Miss Biester, Miss Hunt.
- 176w. Advanced Nutrition. Selected quantitative methods applicable to investigations relating to digestion and metabolism. Prerequisites: Course 73, Agr. Biochem. 2. Four credits. Lect., T I; lab., Th I, II, III; TS II, III, IV; 311, 313HE. Miss Biester.
- 177s. Digestion and Metabolism. An intensive study of problems relating to digestion and metabolism involving lectures, readings, demonstrations, and laboratory work. Prerequisites: Course 175, Agr. Biochem. 2. Three credits. TTh VI, VII, VIII; 213HE. Miss Leichsenring.
- 179w,s. Readings in Nutrition. A course designed to give intensive experience in the use of nutrition books and periodicals, involving assigned readings, oral and written reports. Prerequisite: Course 170. Two credits. Winter, MW IV; spring, TTh I; 213HE. Miss Biester, Miss Leichsenring.
- 182f,w,s. Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. Prerequisite: Course 80. Three credits. MWF VI, VII; 107HE. Miss Child.
- 186f,s. Special Food Problems. Individual problems in foods and food preparation. Prerequisite: Course 182. Three credits. TTh I, II, III; 107HE. Miss Child.
- 187f,s. Special Food Problems. The same as Course 186 with additional problems. Prerequisites: Course 182, Agr. Biochem. 2. Five credits. TTh I, II, III, and 4 hrs. ar.; 107HE. Miss Child.
- 195s. Home Economics Survey. A discussion of the historical development of home economics with special emphasis upon current problems. Two credits. TS IV; 203HE. (Not offered 1929-30.) Miss McNeal.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

202. Animal Fibers. An advanced course dealing with the structure, composition, chemical and physical properties, and special problems of manufacture of wool and silk in relation to their use. Prerequisites: Quant. Chem. 5 cred., Org. Chem. 5 or 6 cred., Adv. Textiles 3 cred. Two credits. Hours and days arranged. Miss Phelps.
204. Plant and Manufactured Fibers. Study of the structure, composition, physical and chemical properties, and special problems of manufacture of cotton, flax, artificial silk and certain minor fibers in relation to

- their use. Prerequisites: Bot. 5 cred., Quant. Chem. 5 cred., Org. Chem. 5 or 6 cred., Adv. Textiles 3 cred. Two credits. Hours and days arranged. Miss Phelps.
210. Microanalysis of Textile Fibers. Laboratory applications of histological and microchemical methods in the study of textile materials. Prerequisites: Bot. 5 cred., Biol. Sci. 10 cred., Org. Chem. 5 or 6 cred., Textile Analysis 3 cred. Two or three credits. Hours and days arranged. Miss Phelps.
270. Principles of Human Nutrition. An intensive study of such factors as the energy, protein, mineral, and vitamin requirement in human nutrition. Hours and days arranged. Miss Biester, Miss Leichsenring.
- 295f,w, 296s. Home Economics Problems. Opportunity is offered for the investigation of selected problems in home economics in fields such as foods, nutrition, textiles, home management and related art. Three or five credits. Hours and days arranged. Miss McNeal, Miss Biester, Miss Child, Miss Goldstein, Miss Leichsenring, Miss Phelps.
- 299f,w,s. Home Economics Seminar. A critical study of recent advances in home economics in fields such as foods, nutrition, and textiles, involving outside reading and oral or written reports. One credit. Hours and days arranged. Miss McNeal, Miss Biester, Miss Child, Miss Goldstein, Miss Leichsenring, Miss Phelps.

## HOME ECONOMICS EDUCATION

Professor Wylle B. McNeal;<sup>1</sup> Associate Professor Clara M. Brown.

*Prerequisites.*—For a minor adequate preparation in psychology, educational psychology, education, and home economics must be presented.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 141f. Problems in Vocational Education in Home Economics. The place and development of home economics in the vocational education program. Study of the problems of the all day, evening, and part time schools. Prerequisite: Course 42. Two credits. Hours and days arranged. Miss McNeal, Miss Rose.
- 142af,w,s. Educational Measurement in Home Economics. Problems of measurement in home economics; home economics tests and scales; construction and evaluation of objective tests. Prerequisite: Course 42. Two credits. Hours and days arranged. Miss Brown.
- 142bw. Educational Measurement in Home Economics. A continuation of Course 142a, dealing with methods of interpretation and utilization of test data. Prerequisites: Course 142a, Ed.Psy. 60. Two credits. Hours and days arranged.
- 143f,s. Home Economics Curricula. The objectives of home economics in junior and senior high schools; recent surveys and other investigations used in determining curriculum content; home economics courses of study. Prerequisite: Course 42 or parallel. Two credits. TTh VIII; 213HE. Miss Brown, Miss Rose.

<sup>1</sup> Absent on leave, 1929-30.

- 147w. Organization and Methods for Related Art Teaching. Organization of a related art course and methods of teaching art principles as applied to familiar objects and processes. Prerequisites: H.E. 53, 131 or parallel. Three credits. TThS III; 402HE. Miss H. Goldstein.
- 149f,w,s. Research Problems. A study of the methods used in collection, treatment, and interpretation of data in the field of home economics. Credits arranged. Hours and days arranged. Permission of instructor. Miss Brown.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 242f,w,s. Seminar in Home Economics Education. Current problems in home economics education will be studied. Required of all candidates minoring in home economics education. One credit. Graduates only. Hours and days arranged. Miss McNeal, Miss Brown.
- 243f,w,s. Administration and Supervision of Home Economics. A study of the duties and problems of teacher trainers, city and state supervisors of home economics. Prerequisites: Courses 42, 49, 143. Three credits. Graduates only. Hours and days arranged. Miss McNeal, Miss Rose.

## HORTICULTURE

Professor William H. Alderman; Associate Professors Wilfrid G. Brierley, Rodney B. Harvey; Assistant Professors Troy M. Currence, Fred A. Krantz, Lewis E. Longley, Arthur N. Wilcox.

*Prerequisites.*—For major work, 15 credits; for minor work, 9 quarter credits in the department in addition to two years in botany and one year in entomology.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 107f. Orchard Management. A detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. Prerequisites: Hort. 6 and Bot. 9 credits. Three credits. TS IV; W VI, VII; 210Hr. Mr. Brierley.
- 110w. Horticultural Crop Breeding. Applied genetics is emphasized. Methods of breeding each of the important horticultural crops with special attention to experiment station investigations and to the methods used by plant breeders. Prerequisite: Hort. 109 or Agron. 131. Three credits. TThS III; 215Hr. Mr. Wilcox.
- 111f. Systematic Pomology. A study of fruit varieties. Lectures, laboratory, and a survey of the literature. Prerequisites: Hort. 6 and Bot. 9 credits. TTh II; Th VI, VII; 8Hr. Mr. Brierley.
- 135f. Truck Crops and Potatoes I. Truck crop production as an applied science. The crop or the plant is used as the unit of consideration and the sciences used to explain cultural practices and plant behavior. Prerequisites: Hort. 32 and Bot. 9 credits. Three credits. Mr. Currence.
- 137w. Truck Crops and Potatoes II. Continuation of Course 135f. Prerequisites: Hort. 32 and Bot. 9 credits. Three credits. Mr. Krantz.



- 190f-191w-192s. Special Problems. A study of problems based upon the work given in the preceding courses. Two to four credits per quarter. Horticultural staff.
- 193f-194w-195s. Horticultural Seminar. Reports and discussions of problems and investigational work. Required of graduate students. One credit per quarter. Horticultural staff.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 242w. Horticultural Crop Breeding Topics. A survey of the recent researches in the breeding of horticultural crops. Two credits. Mr. Krantz, Mr. Wilcox.
- 243f-244w. Advanced Topics in Horticulture. A critical analysis of recent research on horticultural crops. Three credits per quarter. Mr. Alderman, Mr. Brierley, Mr. Harvey, Mr. Currence, Mr. Longley.
- 245f-246s. Seminar. Growth Factors in Crop Production. An analysis of growth and environmental factors as applied to crop plants. Two credits per quarter. Mr. Harvey.

## LATIN

Professor Joseph B. Pike; Assistant Professor Robert V. Cram.

*Prerequisites.*—Any four of Courses 21-73, and 6 credits in addition selected from standard courses. A reading knowledge of French, German, or Greek is required of candidates for the Master's degree.

The degree of master of arts: For a major in Latin, any nine-credit sequence in the two hundred series, and in addition one course each quarter selected from Courses 121-133 or 241-242-243; ordinarily this latter will be required in addition to the other two hundred sequence. The student will be expected to choose for his thesis some problem connected with one of these courses. Besides, a minor is to be carried throughout the year in one of the following departments: Comparative Philology, English, German, Greek, History, Romance Languages, or Scandinavian. For a minor in Latin, any nine-credit sequence in the two hundred series or one course each quarter selected from Courses 121-133.

Candidates for the degree of doctor of philosophy in Latin will be expected to spend at least three years in preparation and will carry each quarter in addition to one seminar course and one of the courses listed below, one course in advanced Greek (i.e., in advance of three years of preparatory Greek). A knowledge of Greek and Roman history, Greek and Roman literature, and a special knowledge of a particular Latin author, or group of authors, will be required. In addition to the particular author or authors assigned the candidate will be expected to have read in the original the following list of Latin authors:

Caesar: A considerable portion of the Gallic War and the Civil War.

Catullus: All except LXIII-LXVIII.

Cicero: Fourteen orations (e.g., Roscius Amerinus, Verres Actio Prima, Imperium, Pompeii, Catilinarians I-IV, Murena, Archias, Milo, Mar-

cellus, Ligarius, Deiotarus, Philippics II; Cato Maior, Laelius, Tusculan Disputations, Book I).

Horace: All.

Juvenal: Satires I, III, IV, VII, VIII, X, XI.

Livy: Books, I, II, XXI, XXII.

Lucretius: Books I-III, V.

Martial: At least one half.

Ovid: About four thousand verses of the *Metamorphoses*.

Plautus: *Amphitruo*, *Aulularia*, *Captivi*, *Menaechmi*, *Miles Gloricus*, *Mos-tellaria*, *Rudens*, *Trinummus*.

Pliny the Younger: At least one half.

Quintilian: Book X, Ch. I.

Suetonius: Iulius, Augustus, Tiberius, Nero, Domitian.

Tacitus: *Annals* I-VI or XI-XVI.

Terence: *Adelphoe*, *Andria*, *Hautontimorumenus*, *Phormio*.

Virgil: All except the minor poems.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

121f. Advanced Virgil. Selection from the *Eclogues*, *Georgics* and from Books 7-12 of the *Aeneid*. Prerequisites: any two of Courses 51-73 or an equivalent. Three credits. MWF II; 109F. (Offered in 1929-30.) Mr. Pike.

122w. Cicero's Letters. Prerequisites: any two of Courses 51-73 or an equivalent. Three credits. Alternates with Course 132. MWF II; 109F. Mr. Pike.

123s. Medieval Latin. The course aims to accustom students to handle medieval Latin easily for historical or literary purposes. Prerequisites: any two of Courses 51-73 or an equivalent. Three credits. MWF II; 109F. Mr. Pike.

131f. Juvenal. Selection from Juvenal's work. Prerequisites: any two of Courses 51-73 or an equivalent. Three credits. Alternates with Course 121. MWF II; 109F. Mr. Pike.

132w. Seneca's Epistles. Prerequisites: any two of Courses 51-73 or an equivalent. Three credits. Alternates with Course 122. MWF II; 109F. (Offered in 1929-30.) Mr. Pike.

133s. Vulgar Latin. Lectures on vulgar Latin; selections from Petronius and Grandgent's *Introduction to Vulgar Latin*. Prerequisites: any two of Courses 51-73 or an equivalent. Alternates with Course 123. Three credits. MWF II; 109F. (Offered in 1929-30.) Mr. Pike.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Tacitus. (Graduate seminar.) Prerequisites: seven years of Latin or any two of Courses 121-133. Nine credits. Mr. Pike.

211f-212w-213s. Graduate Seminar. Lucretius. Prerequisites: seven years of Latin or any two of Courses 121-133. Nine credits. T VIII, IX; 314Lib. (Offered in 1930-31.) Mr. Pike.

- 221f-222w-223s. Graduate Seminar. Cicero's Philosophical Works. Prerequisites: seven years of Latin or any two of Courses 121-133. Nine credits. Mr. Pike.
- 231f-232w-233s. Graduate Seminar. Cicero's Rhetorical Works. Prerequisites: seven years of Latin or any two of Courses 121-133. Nine credits. T VIII, IX; 314Lib. (Offered in 1929-30.) Mr. Pike.
- 241f-242w-243s. Graduate Seminar. Introduction to Classical Philology. Nine credits. Th VIII, IX. Offered yearly. 314Lib. Mr. Cram.

*Note on summer school courses.*—For the convenience of students who wish to secure the M.A. degree by work taken exclusively in the Summer Session the following courses are offered in successive summers:

145. Roman Tragedy. Three credits.
146. Roman Comedy. Three credits.
147. Annals of Tacitus. Three credits. (Offered in 1930.)
154. Elegiac Poets. Three credits.
- 211su-212su-213su. Lucretius. Six credits for the three summers.

#### LIBRARY METHODS

The course in Bibliographic Seminar (101-102) offered by the librarian, Frank K. Walter, is recognized for general graduate credit. With the approval of the adviser, it may be counted toward any major or minor.

#### MATHEMATICS AND MECHANICS

Professors Raymond W. Brink, William E. Brooke, William H. Bussey, Edward U. Condon, Hans H. Dalaker, William L. Hart, Dunham Jackson, William H. Kirchner, George C. Priester; Associate Professors Royal R. Shumway, Anthony L. Underhill, Hugh B. Wilcox; Assistant Professors William O. Beal, Charles Boehnlein, Elizabeth Carlson, Gladys E. C. Gibbens.

Professor Dalaker is chairman and Professor Underhill is secretary of the group. Students majoring in mathematics should consult one or the other.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 102f-103w-104s. Advanced Analytic and Synthetic Geometry. Three credits per quarter. Miss Gibbens.
- 106f. Differential Equations. Three credits. MWF III; 101F. Mr. Hart.
- 107w-108s. Advanced Calculus. Three credits per quarter. MWF III; 101F. Mr. Hart.
- 111f-112w-113s. Celestial Mechanics. Three credits per quarter. (This course is identical with Astronomy 111-112-113.) Mr. Beal.
- 115f-116w-117s. Differential Geometry. Three credits per quarter. TThS III; 101F. (Offered in 1929-30.) Mr. Underhill.
- 118f-119w-120s. Vector Analysis. Three credits per quarter. (Offered in 1929-30.) Mr. Jackson.

- 121f-122w-123s. Mathematical Theory of Statistics. Three credits per quarter. (Offered in 1930-31.) Mr. Jackson.
- 127f,w,s. Technical Mechanics. Five credits. Mr. Wilcox.
- 128f,w,s. Strength of Materials. Five credits. Mr. Priester.
- 140w. Method of Least Squares. Three credits. (This course is identical with Astronomy 140.) Mr. Beal.
- 144f-145w-146s. Topics in Mathematical Analysis. Three credits per quarter. Mr. Brink.
- 151f-152w-153s. Differential Equations and Advanced Calculus with Applications to Engineering Problems. Three credits per quarter. Mr. Dalaker, Mr. Doeringsfeld.
- 161f-162w-163s. Advanced Technical Mechanics. Three credits per quarter. Mr. Wilcox.
- 171f-172w-173s. Aerodynamics. Three credits per quarter. Mr. Boehnlein.
- 180f-181w-182s. Advanced Strength of Materials. Three credits per quarter. Mr. Priester.
- 184f-185w-186s. Advanced Testing Materials Laboratory. Two to six credits. Mr. Priester.
- 191f-192w-193s. Hydraulic Motors and Pumps. Three credits per quarter. Mr. Boehnlein.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f. Heat Conduction, Diffusion and Wave Optics. Three credits. (This course is identical with Physics 201f.) Mr. Condon.
- 203w. Mechanics of Continua. Three credits. (This course is identical with Physics 203w.) Mr. Condon.
- 205s. Advanced Dynamics. Three credits. (This course is identical with Physics 205s.) Mr. Condon.
- 206f-207w-208s. Theory of Functions of Real and Complex Variables. Three credits per quarter. (Offered in 1930-31.)
- 221f-222w-223s. Calculus of Variations. Three credits per quarter. Mr. Underhill.
- 248-249-250. Reading and Research. Competent students will be assisted in independent readings and reports, by members of the department. One to three credits per quarter.
- 274f-275w-276s. Dynamics of a Particle. Three credits per quarter. Mr. Brooke.
- 291f-292w-293s. Hydrodynamics. Prerequisites: 123, 153. Three credits per quarter. Mr. Brooke.

The following courses have been offered from time to time in the past, and similar courses, or other courses of corresponding grade, will be provided at any time when there is sufficient demand for them.

114. The Mathematics of Small Vibrations.
131. Advanced Differential Equations.
- 254-255-256. Modern Analysis. (Based on Whittaker and Watson's text.)
- 261-262-263. Theory of Functions of a Complex Variable. Three credits per quarter throughout the year.

- 267-268-269. Advanced Dynamics. Vol. II. Routh's *Dynamics*.  
 271-272-273. Theory of Linear Differential and Integral Equations.  
 277-278-279. Advanced Statics.  
 294-295-296. Theory of Elasticity.  
     Projective Geometry.  
     The Theory of Numbers.  
     The Galois Theory of Equations.  
     Higher Plane Curves.  
     The Calculus of Finite Differences.  
     Modern Theories of Integration.  
     Advanced Descriptive Geometry.  
     Perspective.  
     Fourier's Series and Spherical Harmonics.  
     Advanced Analytic Geometry of Space.  
     Elliptic Functions and Integrals with Applications.  
     Limits and Series.  
     Modern Higher Algebra.

## MECHANICAL ENGINEERING

Professors John R. DuPriest, Frank B. Rowley,<sup>1</sup> S. Carl Shipley,<sup>1</sup> Charles F. Shoop; Associate Professors John V. Martenis, Burton J. Robertson; Assistant Professor John Flodin.

## INDUSTRIAL ENGINEERING

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 170w. Industrial Plants. Factory organization and construction for economical manufacture. Organization of the industry. Location and type of buildings, power development. Layout of plant. Routing systems and machine layout. Heating and ventilating requirements. Distribution of power; internal transportation. Lectures, recitations, and drawing room practice. Three credits. Open to seniors who have had Course 15 or 16. Mr. Shipley.
- 171f. Production Methods. Principles and practice involved in economical production. Standardization. Requirements for uniformity and interchangeability. Jigs, fixtures, and special equipment; gages and inspection systems. Division of labor. Lighting, heating, and sanitation. Conveying, handling, and stores control. Fatigue elimination. Three credits. Open to seniors who have had Course 15 or 16. Mr. Shipley.
- 173s. Industrial Management. General principles. The Taylor system; wage, bonus, and profit sharing systems. Maintenance and depreciation. Purchasing. Allocation of cost, overhead, and machine burden. Graphical representation. Prerequisite: Course 171. Mr. Shipley.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 274f. Industrial Management Laboratory. Planning department. Time and motion studies; rate setting. Instruction cards. Production control.

<sup>1</sup> Absent on leave, 1929-30.

- Shop practice with investigation in local factories. Lectures, assigned reading, practice, and reports. Prerequisite: Course 173. Three credits. Mr. Shipley.
- 275w. Industrial Management. Labor administration. Foreman training. Training the worker; job analysis. Employment and turnover; the human element, service departments. Stabilization of labor. Lectures, reading, shop visits, and reports. Prerequisite: Course 274. Three credits. Mr. Shipley.
- 276s. 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. Prerequisite: Course 171. Three credits. Mr. Shipley.
- 277f-278w-279s. Industrial Engineering Problems. Special investigations of practical problems and suggested methods of procedure. Lectures, assigned reading, shop visits and reports. Prerequisite: Course 173. Three credits. Graduates only. Mr. Shipley.

#### MACHINE DESIGN

- 121f-122w-123s. Advanced Engineering Design. Original design, including machinery for changing size and form, cranes, pumping, transmission machinery, and engineering appliances. Lectures, problems, and drawing room practice. Prerequisite: Course 35. Two credits per quarter. Mr. Flodin.

#### STEAM ENGINEERING

- 135f. Design of Steam Machinery. Piping systems, boiler and engine details, settings, valve gears, governors, turning moment diagrams, fly wheel weights, etc. Prerequisite: Course 141. Two credits. Mr. Shoop.
- 141s. Thermodynamics. Application of the elementary principles of thermodynamics to heat motors and power plant equipment. Treatment of the actual and ideal cycles. Prerequisite: Course 31. Three credits. Mr. DuPriest.
- 142w. 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. Prerequisite: Course 141. Three credits. Mr. Shoop.
- 143w. 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, inter-cooling, etc. Prerequisite: Course 141. Three credits. Mr. Shoop.
- 144f. Power Plant Machinery. Advanced study and application of engines, stokers, boilers, fans, purifiers, heaters, coal and ash handling equipment, etc. Prerequisite: Course 30. Three credits. Mr. Shoop.

- 145s. Design of Power Plant Units. Treatment of condensers, air pumps, boilers, cooling towers, stage evaporators, heaters, steam piping lubricating systems, etc. Prerequisite: Course 143. Two credits. Mr. Shoop.
146. 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. Prerequisite: Course 30. Three credits. Mr. Shoop.
- 148f,w. 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. Prerequisite: Course 34. Two credits. Mr. Shoop.
- 149w. Design of Steam Machinery. Includes stokers, superheaters, feedwater heaters, feed pumps, automatic controls, etc. Prerequisite: Course 135. Two credits. T VII-IX, S I-III; 151ME. Mr. Shoop.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 241f. 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. Prerequisite: Course 141. Three credits. 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. Prerequisite: Course 145. Two credits per quarter. 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. Prerequisite: Course 145. Three credits. Mr. Shoop.

## HEATING, VENTILATION, AND REFRIGERATION

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 163f. Heating and Ventilation. Principles of heating and ventilation including the design and layout of furnace, steam, hot water, vapor, vacuum, and fan systems of heating. The requirements and design of ventilating systems. General principles of central station heating. Recitations, lectures, and design. Prerequisites: M.&M. 127, 128, 129. Four credits. Mr. Rowley.
- 164s. Heating and Ventilation. Principles of heating and ventilation. Heating systems; furnaces, steam, hot water, vapor, vacuum and fan blast. Piping systems. Ventilation: humidification, synthetic air chart. Temperature regulation. Prerequisite: M.&M. 92. Two credits. Mr. Rowley.

- 165f,w,s. Advanced Heating and Ventilation. Advanced course for seniors and graduates. To cover special problems as selected. Prerequisite: Course 63. Three credits. Mr. Rowley.
- 166s. Compressed Air and Refrigerator Machinery. (a) Air compressors and motors; power transmission by compressed air. (b) Principles of refrigeration. Various types of refrigerating machines, refrigerants application to ice making, cold storage, cooling of air, liquids, and solids. Lectures and recitations. Prerequisite: Course 141. Three credits. Mr. Nicholas.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 265f,w,s. Advanced Heating and Ventilating. Special course for graduate students. To be taken in connection with research work in the laboratory, Course 291. Prerequisite: Course 63. Credits to be arranged. Mr. Rowley.
- 267w. Mechanical Equipment of Buildings. Selection of heating, ventilating, and plumbing systems for various types of buildings. Piping layouts, piping for fire protection, air, gas, and vacuum cleaning, elevators. Design and layout of equipment. Lectures and drafting. Prerequisites: Course 163, Phys. 43. Three credits. Mr. Marten's.

#### GAS ENGINES AND AUTOMOTIVES

##### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 150f. Internal Combustion Engines. Laws of gases; gas cycles. Otto, semi-Diesel, and Diesel engines. Mechanism of various types. Carburetion, governing, cooling, lubrication. Principles of design. Gas producers; types, suction, pressure, blast furnace. By-products recovery. Prerequisite: Course 141. Three credits. Mr. Robertson.
- 151w. Advanced Internal Combustion Engines. Continuation of 150 with special reference to automobile and motor truck engines. Theoretical consideration of fuels, combustion, detonation, lubrication, etc. Prerequisite 150. Three credits. Mr. Robertson.
- 152s. Automobile 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. Standard engine and chassis road tests. Prerequisite: Course 151. Two credits. Mr. Robertson.
- 153s. Automotive 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. Lectures and recitations. Prerequisite: Course M.E. 150. Three credits. Mr. Robertson.
- 155s. Gas Engines and Producers. Laws of gases, gas cycles, Otto, semi-Diesel, and Diesel engines. Carburetion, cooling, lubrication, and governing. Gas producers and by-product gases. Prerequisite: Course 137. Three credits. Mr. Robertson.
- 156f,w. Gas Engine Design. Calculations and working drawings of a gas motor for heavy duty tractor, truck, marine, or other service. Theo-



retical diagrams and details of parts. Senior option. Prerequisite: registration in 150. Two credits. Mr. Robertson.

- 157w,s. Advanced Gas Engine Design. Prerequisite: Course 156. Two credits. Mr. Robertson.
- 158s. Advanced Gas Engine Design. Prerequisite: Course 157. Two credits. Mr. Robertson.
- 159f,w. Power and Gas Engine Laboratory. Tests of gas and gasoline engines, and gas producers. Power and lighting plants. Prerequisite: registration in Course 150. Two credits. Mr. Robertson.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 251-252-253. Automobile and Motor Truck Design. Theory and design of the automobile and motor truck engine and chassis in which the design of the complete engine, transmission, and chassis is carried out. Lecture and drawing room. Two credits. Graduates. Mr. Robertson.
254. Gas Tractor Design. Selection of wheel sizes; horse power weight and drawbar pull. Bearing pressures; ratios and strength of gearing. Details of principal parts. Senior option. Prerequisite: Course 156. Two credits. Mr. Robertson.
- 255-256-257. Automobile Testing and Research. Dynamometer and road tests including over-all efficiency of cars and motor trucks, transmission efficiencies, performance of cars at various speeds, fuel consumption, effect of road surface on traction, efficiencies, and general performances. Special research problems. Three credits per quarter. Graduates. Mr. Robertson.
258. 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. Prerequisite: Course 152. Ar. Three credits. Mr. Robertson.

#### WATER POWER MACHINERY

- 189s. Water Turbines. The theory of operation, design, construction, and regulation of water turbines. Turbine testing; characteristics, selection of type. Cost of turbines and water power. Prerequisite: M.&M. 120. Three credits.

#### RAILWAY MECHANICAL ENGINEERING

281. Railway Technology. Systematic course of visits to the various railroad shops in the vicinity to study locomotive details and classifications. Locomotive practice. Lectures and reports. Prerequisites: M.&M. 127, 128, 129. One credit. Mr. Martenis.
- 282-283-284. 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. Prerequisite: Course 281. Three credits per quarter. Mr. Martenis.

## NAVAL ARCHITECTURE

- 185f,w,s. Theoretical Naval Architecture. Ship measurement; stability and trim; resistance, coefficients, speed, and powering. Two credits; jr., sr., grad., preferably preceded by Course 85. Mr. Flodin.
- 186f,w,s. Theoretical Naval Architecture. Strength of ship as a whole, and of various parts of the ship under local stresses; effect of rolling, pitching, and vibration. Prerequisite: Course 185. Two credits. Mr. Flodin.
- 187f,w,s. Ship Drawing. Preliminary design of commercial ships, including consideration of mechanical equipment, with special emphasis on river and lake transportation. Prerequisite: Course 186. Two credits. Mr. Flodin.

## SEMINARS AND RESEARCH

- 194s. Advanced Engineering Laboratory. Opportunity will be offered for carrying on investigations and tests of power units, refrigerators, compressors, fans or other problems as arranged. Prerequisites: Courses 182, 183. Two credits.
- 190f-191w-192s. Seminar. Reading of assigned articles in current technical press. Classroom presentation of principal features of assigned articles. One credit. Arranged for seniors and graduates.
- 290-291-292. Mechanical Engineering Research. Courses may be elected which involve investigations in connection with lubrication, fuels, furnaces, boilers, steam engines, turbines, gas engines, heating and ventilation, industrial and other engineering problems. Reports, special problems, and related tests. Prerequisite: Course 194 or registration in 194. Credits as arranged per quarter.

## MEDICAL SOCIAL WORK

For statement of prerequisites and of graduate courses and staff, see Sociology.

## MEDICINE

(Including General Medicine, Dermatology, and Nervous and Mental Diseases)

The graduate work in the Department of Medicine is designed to prepare students for practice of the specialty of internal medicine, research in the problems of general medicine, and for the specialty of nervous and mental diseases, as the case may be, and to train men as teachers in their respective fields. Prospective students who have had no special work in addition to that of the undergraduate course in physiology, physiologic chemistry, therapeutics, experimental medicine, or pathology are advised to devote a year or more to these subjects before entering the regular three-year graduate course. Throughout the course it is recommended that

a minor be carried in one or more of the following departments: Physiology, Pharmacology, Pathology, Immunology, and Pediatrics. For students specializing in nervous and mental diseases, minors in anatomy and psychology are especially valuable, and for those desiring it, work would be arranged in the Department of Ophthalmology and Oto-Laryngology, giving a special opportunity to study lesions of the eye occurring in systemic disorders. In the Medical School, during at least the third year of the three-year fellowship, the fellow acts as an officer of the clinic with definite responsibility in the care of patients in the University Hospital.

For courses of study see special bulletin of graduate courses in medicine.

### METALLOGRAPHY

Professor Oscar E. Harder; Assistant Professor R. L. Dowdell.

*Prerequisites.*—For major work, adequate preparation in the sciences fundamental to metallography (chemistry, physics, geology, technical subjects), the general requirements being fulfilled. For minor work, the prerequisites to the courses to be pursued.

Exemption from the language requirements for the Master's degree may be made in individual cases.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 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. Two lectures, three laboratory hours per week. Three credits. MW I; 315M. M VI, VII, VIII; 307M. Mr. Dowdell.
- 151w. Advanced Metallography for Electrical Engineers. Continuation of 150. Two lectures, three laboratory hours per week. Prerequisite: Course 150. Three credits. MW I; 315M. M VI-VIII; 307M. Mr. Dowdell.
- 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. Three lectures, four laboratory hours per week each quarter. Prerequisites: Chem. 28, Phys. 43. Five credits per quarter. MWF VI or VII; 305M. T VI-IX; 307M. Mr. Dowdell.
- 156f. Metallography for Mechanical Engineers. Similar to 150 but specially arranged for students in mechanical engineering. Two lectures, three laboratory hours per week. Three credits. ThS III; 112M. W or F VII-IX; 307M. Mr. Harder.
- 157w. Advanced Metallography for Mechanical Engineers. Continuation of 156. Two lectures, three laboratory hours per week. Prerequisite: Course 156. Three credits. ThS III; 112M. W or F VII-IX; 307M. Mr. Harder.

- 160f. Metallography for Chemical Students. Principles of metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, microscopic examination and making of photomicrographs; typical alloy systems as iron carbon (steel and cast iron), some non-ferrous alloys. Prerequisite: Chem. 20. Two lectures and 3 laboratory hours per week. Three credits. MW II; 112M. Th VI-VIII; 307M. Mr. Dowdell.
- 161w. Advanced Metallography for Chemical Students. Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Prerequisite: Course 160. Two lectures and three laboratory hours per week. Three credits. MW II; 112M. Th VI-VIII; 307M. Mr. Dowdell.
- 162s. Advanced Metallography for Chemical Students. Metallography of the non-ferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. Prerequisite: Course 160. Two lectures and three laboratory hours per week. Three credits. MW II; 112M. Th VI-VIII; 307M. Mr. Dowdell.
- 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. Prerequisites: Courses 151, 155, 157, or equivalent. Credits and hours arranged. 305M. Mr. Harder.
- 164w. Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work. Prerequisites: Courses 151, 155, 157, or equivalent. Credits and hours arranged. 305M. Mr. Harder.
- 165s. Advanced Metallography. Technical metallography as applied to the automotive industry. Lectures and special reports. May be accompanied by laboratory work. Prerequisites: Courses 151, 155, 157, or equivalent. Credits and hours arranged. 305M. Mr. Harder.
- 163f-164w-165s. Laboratory. Laboratory work on special problems in ferrous, non-ferrous, and X-ray metallography. Hours and credits arranged. Mr. Harder.

#### COURSE PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Advanced Metallography for Graduate Students. Intended primarily for research work. Credits and hours arranged. 305M. Mr. Harder.

#### METALLURGY

Professors Peter Christianson, Levi B. Pease.

*Prerequisites.*—Elements in physics and chemistry.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 104w. Metallurgy of Pig Iron and Wrought Iron. General underlying principle of iron ore reduction, including construction, operation, and regulation of the iron blast furnace together with direct reduction of

- iron ore and refining products in the hearth and puddling furnaces. Prerequisite: General Metallurgy 3f. Three lectures and one consultation hour per week. Three credits. TThS I; 108M. Mr. Christianson.
- 105s. Metallurgy of Steel. General principles involved in the refining and purification of pig iron and scrap into various grades of steel. Three lectures and one consultation hour per week. Three credits. TThS I; 108M. Mr. Christianson.
- 106f. Metallurgy of Base Metals. Lead, copper, zinc. Consideration of methods and principles involved in roasting, smelting, and refining base metals. Hydrometallurgy and electrolytic refining. Four lectures per week. Three credits for graduates. TThS III; F I; 108M. Mr. Pease.
- 107w. Metallurgy of Base Metals. Continuation of Course 106f. Four lectures per week. Three credits. Mr. Pease.
- 108s. Metallurgy of Precious Metals. Principles involved and methods used in the extraction of gold, silver, and other precious metals. Cyanidation, amalgamation and refining. Four lectures per week. Three credits. TThS III; F IV; 108M. Mr. Pease.
- 110f-111w. Ore Dressing. General principles involved in the crushing, sizing, gravity separation, flotation and magnetic concentration of ores. Three credits. Lectures, MWF III; conferences; 202M. Mr. Pease, Mr. Allard.
- 112f-113w-114s. Ore Dressing Laboratory. Practical examination of ores. Operation of laboratory ore dressing equipment. Laboratory concentration of common ores. Two credits. Laboratory and conference. Th VI-IX. Mr. Pease, Mr. Allard.
- 117w. Advanced Metallurgy. Metallurgical calculations to determine heat balance and heat distribution in furnaces. Four lectures and six laboratory hours per week. Four credits. TWThFS II; Th VI, VII, VIII, IX; 108M. Mr. Christianson.
- 118s. Advanced Metallurgy. Designs of furnaces together with laboratory work. Consultations. Hours same as 117s. 108M. Mr. Christianson.
- 123f. Electrometallurgy. Application of electricity to the production of heat for the smelting of ores and refining of metals. Relative cost of fuel and electric heating; also relative efficiencies of fuel and electric furnaces. Construction of high temperature furnaces and operation of commercial plants. Three lectures and one consultation hour per week. Three credits. MW I; S IV; 108M. Mr. Christianson.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 204f-205w-206s. Thesis courses for graduate students. Intended primarily for research work. Credits and hours arranged. Mr. Christianson, Mr. Pease.
- 207-208-209. Special Problems in Metallurgy. Seminar work on metallurgical problems. Credits and hours arranged. Mr. Christianson, Mr. Pease.
- 210-211-212. Special Problems in Advanced Metallurgy. Intended primarily for research work. Credits and hours arranged. Mr. Christianson, Mr. Pease.

## OBSTETRICS AND GYNECOLOGY

For staff and courses of study offered, see special bulletin of graduate work in medicine.

## OPHTHALMOLOGY AND OTO-LARYNGOLOGY

For staff and courses of study offered, see special bulletin of graduate work in medicine.

## PATHOLOGY

*Prerequisites.*—Graduate students who desire to take their major or minor work in pathology must present credits in the following subjects: physics, 8 credits; general and organic chemistry, 12 credits; zoology, 6 credits; and a reading knowledge of German.

In addition, students who elect their major work in pathology must present credits for the equivalent of the first two years' work of the Medical School of this University.

For staff and courses of study offered, see special bulletin of graduate work in medicine.

## PEDIATRICS

For staff and courses of study offered, see special bulletin of graduate work in medicine.

## PHARMACOLOGY AND THERAPEUTICS

For staff and courses of study offered, see special bulletin of graduate work in medicine.

## PHILOSOPHY

Professors Norman Wilde, David F. Swenson;<sup>1</sup> Associate Professor George P. Conger.

*Prerequisites.*—For a major, 18 credits; for a minor, 9 credits.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 100f. History of Religions. Prerequisite: 10 credits. Three credits.  
TThS II; 322F. Mr. Conger.
- 101w. Psychology of Religion. Prerequisite: 10 credits. Three credits.  
TThS II; 322F. Mr. Conger.
- 102s. Philosophy of Religion. Prerequisite: 10 credits. Three credits.  
TThS II; 322F. Mr. Swenson.
- 103s. Esthetics. Prerequisite: 10 credits. Three credits. MWF II; 322F.  
Mr. Swenson.
- 104s. History of Esthetic Theory. Prerequisite: 10 credits. Three credits.  
MWF II; 322F. (Alternates with 103. Not offered in 1929-30.) Mr.  
Swenson.

<sup>1</sup> Absent on leave, 1929-30.

- 108f-109w-110s. History of Ethics. Prerequisite: 20 credits in any social science or 10 credits in philosophy. Six credits. TS IV; 322F. Mr. Wilde.
- 115w. Contemporary Philosophy. Prerequisite: Philosophy 50, 51, or 52. Three credits. MWF III; 322F. Mr. Conger.
- 120w. Scandinavian Philosophy. Prerequisite: 10 credits. Three credits. TTh 1:00-3:20; 316F. (Not offered in 1929-30.) Mr. Swenson.
- 124f. Political and Social Ethics. Prerequisite: 20 credits in any social science, or 10 in philosophy. Five credits. T-S I; 322F. (Not offered in 1929-30.) Mr. Wilde.
- 129w. Modern Political Thought. Prerequisite: 10 credits in philosophy, or 20 credits in any social science. Five credits. T-S I; 322F. Mr. Wilde.
- 135f-136w. The Philosophy of Plato. Prerequisite: 10 credits. Six credits. MWF VIII; 338Lib. Mr. Swenson.
- 141s. Metaphysics. Prerequisite: 10 credits, including Philosophy 2. Five credits. M-F III; 322F. Mr. Conger.
- 147f-148w. Advanced Logic. Prerequisite: 10 credits, including Philosophy 2. Six credits. MWF II; 322F. Mr. Swenson.
- 151f-152w. Modern Idealism. Prerequisite: 15 credits. Six credits. MWF VIII; 338Lib. (Not offered in 1929-30.) Mr. Swenson.
- 161f-162w-163s. Seminar in Philosophy. Individual investigation, topics to be determined after consultation with the department. Prerequisite: 20 credits. Nine credits. Mr. Wilde, Mr. Swenson, Mr. Conger.

### PHYSICS

Professors Henry A. Erikson, Edward U. Condon, Louallen F. Miller, John T. Tate, Anthony Zeleny; Associate Professors J. William Buchta, Joseph Valasek.

*Prerequisites.*—For major work, differential and integral calculus and two years of physics of college grade. For minor work, one year of college physics.

A student majoring in physics is required to take Courses 101-103-105 and 52 unless excused by the department upon satisfactory evidence at entrance. A course of general reading as outlined by the department in each case is also advised.

For the Master's degree a reading knowledge of French or German is required. It is desirable that this requirement be fulfilled before graduate work is begun. For the Ph.D. degree a reading knowledge of both French and German is required.

### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-103w-105s. Theoretical Physics. An analytical survey of fundamental principles of mechanics, sound, heat, light, electricity, and magnetism, designed to supplement the general courses and to prepare students for

- more specialized courses. Five lectures a week. Prerequisites: 12 credits in physics, Math. 51. Five credits per quarter. MTWFS IV; 145Ph. Mr. Tate.
- 104w. Precision Mechanics. Standard methods of precise measurements of length, mass, and time. Two three-hour sessions a week. Prerequisites: 12 credits in physics, Math. 51. Three credits. Hours to be arranged. Mr. Buchta.
- 114f-116w-118s. Elementary Physical Investigation. The experimental or theoretical study of physical phenomena the nature or laws of which are not as yet understood. Prerequisites: Physics 105 or equivalent, Math. 51. The work in this course requires the submission of a written report on the work accomplished. Three credits per quarter. Hours to be arranged. Staff.
- 115f-117w-119s. Problem Course. The work of this course consists entirely in solving problems and exercises designed to give practice in the mathematical analysis of physical problems. Prerequisites: Phys. 105, Math. 51. Three credits per quarter. Mr. Buchta.
- 124f,s. Pyrometry. A theoretical and experimental study of different principles involved in temperature measurement, covering standardization and calibration with some practical considerations. Prerequisite: 12 credits in physics. Three credits. MWF VI-IX; 244Ph. Mr. Miller.
- 126s. Advanced Heat. A theoretical and experimental study of heat phenomena such as comparative calorimetric methods, temperature regulators, ratio of specific heats of gases, conductivities and radiation. Prerequisite: 12 credits in physics. Three credits. Mr. Miller.
- 134f,w. Applied Optics. Special experimental work in spectrometry, optical instruments, photometry, absorption, polarized light. Two three-hour laboratory periods a week. Prerequisite: Course 34. Three credits. Hours to be arranged. Mr. Valasek.
- 136w,s. Spectrum Analysis. An experimental course dealing with the measurement of wave lengths, intensities, and absorption coefficients in the infra-red, visible, and ultra-violet regions of the spectrum. Two three-hour laboratory periods a week. Prerequisite: Course 34. Three credits. Hours to be arranged. Mr. Valasek.
- 144f. Electrical Measurements. Devoted mainly to the study of potentiometer methods, capacity, inductance, magnetic flux. Three two-hour laboratory periods a week. Three credits. See engineering program. Mr. Zeleny.
- 146w. Electrical Measurements of Precision. Precision measurements of electromotive force, current, resistance, capacity, inductance, and magnetic flux. Use of apparatus of highest precision. Three two-hour laboratory periods a week. Prerequisite: Course 144. Three credits. Hours arranged. Mr. Zeleny.
- 148w. Radioactivity. An analytical study of the theories and methods of investigation supplemented by laboratory technique. Those pursuing this course should continue with Chemistry 151, Radiochemistry. Prerequisites: Courses 43 and 44. Three credits. Hours arranged. Mr. Erikson.



- 150f. Conduction through Gases. An analytical study of the theories and methods of investigation, supplemented by laboratory technique. Prerequisites: Courses 43 and 44. Three credits. Hours arranged. Mr. Erikson.
- 152s. X-Rays. A study of the nature and production of X-rays. Prerequisites: Courses 43 and 44. Three credits. Hours arranged. Mr. Erikson.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

Physics 101-103-105 and Mathematics 51 are prerequisites for all the courses listed below. All the courses have as many lectures per week as credits.

Courses 201f-217s form a cycle which will be covered in three years. Those to be given in 1929-30 are 201f, 203w, and 205s.

- 201f. Heat Conduction, Diffusion and Wave Optics. Boundary value problems of mathematical physics. Fourier series, Bessel functions, spherical harmonics, and related topics. Three credits. MWF IV. Mr. Condon.
- 203w. Mechanics of Continua. Kinematics and dynamics of deformable bodies, with applications to acoustics and seismology. Three credits. MWF IV. Mr. Condon.
- 205s. Advanced Dynamics. The general methods of Lagrange, Hamilton, and Jacobi. Variation principles. Perturbation theory. Three credits. MWF IV. Mr. Condon.
- 207f. Thermodynamics. The three laws and their application to physical and chemical problems. Three credits per quarter. MWF IV. Mr. Condon.
- 209w. Kinetic Theory of Matter. Distribution of velocities, equation of state and transfer phenomena in gases. Crystal physics from the molecular standpoint. Three credits per quarter. MWF IV. Mr. Condon.
- 211s. Statistical Mechanics. Theory of probability and its application to mechanics. Brownian movement and other fluctuation phenomena. Quantum statistics. Three credits per quarter. MWF IV. Mr. Condon.
- 213f-215w. Electricity and Magnetism. The classical theory: electrostatics, magnetostatics, electrodynamics. Three credits per quarter. MWF IV. Mr. Condon.
- 217s. Theory of Relativity. Electromagnetic theory of light. Special theory of relativity and introduction to Einstein's theory of gravitation. Three credits per quarter. MWF IV. Mr. Condon.
- 221f-223w-225s. Modern Theoretical Physics. Lectures on developments of current interest. The topic for 1929-30 will be the quantum mechanics, with emphasis on the interaction of matter and radiation: absorption and emission of line spectra, photoelectric effect, Compton effect, Raman effect, dispersion. Three credits per quarter. TThS III. Mr. Condon.
- 231f. Advanced Optics. X-ray diffraction. Geometrical optics and optical instruments. Interference, diffraction, and polarization with applications to spectrum analysis. Diffraction of X-rays by crystals. Crystallography and crystal structure. Four credits. Hours arranged. Mr. Valasek.

- 233w. Radiation. Optical properties of matter. Black body radiation and luminescence. Reflection and refraction by transparent substances, metals, and crystals. Three credits. Hours arranged. Mr. Valasek.
- 235s. Theories of Optical Properties. Dispersion, optical rotation, magneto- and electro-optical properties. Optical phenomena due to motion. Optical properties of moving media. The Lorentzian transformation and introduction to the theory of relativity. Three credits. Hours arranged. Mr. Valasek.
- 241f-243w-245s. Contemporary Experimental Physics. Discussion of fields of investigation which are of present interest and importance. Three credits per quarter. Mr. Tate, Mr. Buchta, Mr. Valasek.
- 252f-254w-256s. Research. Under the special direction of individual members of the staff.
- 261f-263w-265s. Seminar. Study of present day problems in physics. Three credits. One hour a week. Open to those who are doing graduate work in physics. Mr. Tate.

The following courses will be offered provided at any time there is sufficient demand for them:

Hydrodynamics and Theory of Elasticity.

Advanced Topics in Electron Theory and the Special Theory of Relativity.

The General Theory of Relativity.

Advanced Quantum Theory.

The Partial Differential Equations of Mathematical Physics.

Applied Electricity—Theory of Electrical Circuits.

### PHYSIOLOGY AND PHYSIOLOGIC CHEMISTRY

*Prerequisites.*—The Department of Physiology is well equipped for the various types of physiologic investigation. The library facilities are good.

For a minor in physiology, general zoology, general and organic chemistry, and college physics are prerequisites. (In exceptional cases high school physics may be accepted.) For a major, physical chemistry is desirable.

In addition, each student majoring in physiology or physiologic chemistry must have had the general courses, Physiology 100, 101, 103, 104, or the equivalent.

For staff and courses of study offered, see special bulletin of graduate work in medicine.

### PLANT BREEDING

Plant breeding may be elected as a field for either major or minor work. For prerequisites for specialization and statement of courses of study see announcement under Agronomy and Plant Genetics.

### PLANT PATHOLOGY AND BOTANY

Professors Edward M. Freeman, Elvin C. Stakman; Associate Professor Julian G. Leach; Assistant Professors Jonas J. Christensen, Herman A. Rodenhiser; Instructor Louise T. Dossall.

Note.—For courses in botany including plant physiology see Department of Botany.

*Prerequisites.*—The minimum requirement is (a) three years (27 credits) in the plant sciences; (b) general bacteriology one quarter (4 credits) or some equivalent; (c) one year (9 credits) in plant pathology—preferably two years (18 credits), including mycology.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 105f-106w-107s. Mycology. Morphology, taxonomy, and biology of fungi. Lecture, laboratory, greenhouse, and field work. Prerequisites: Botany I and 2 or equivalent. Three or five credits per quarter. TTh VI, VII, VIII; 302PP. Mr. Freeman, Miss Dossdall.
- 111w. Diseases of Cereal Crops. Symptomatology, etiology, and practical methods of control. Laboratory, lecture, and field work. Prerequisite: Course I or 10. MWF VI, VII; 106,107PP. Mr. Christensen.
- 112s. Diseases of Fruit Crops. Especially those important in Minnesota. Laboratory, lecture, and greenhouse work. Three credits. MWF VI, VII; 106,107PP. (Given in alternate years; not offered in 1929-30.) Mr. Leach.
- 113s. Diseases of Vegetable Crops. Diseases of potatoes and other vegetable crops. Lecture, reference, laboratory, and greenhouse work. Three credits. MWF VI, VII; 106,107PP. (Given in alternate years; offered in 1929-30.) Mr. Leach.
- 114w. Advanced Forest Pathology. Wood rots, including a study of the deterioration of wood products caused by fungi. Lectures, laboratory, and greenhouse work. Three credits. MWF VIII, IX; 106,107PP. (Given in alternate years; offered in 1929-30.) Mr. Stakman, Mr. Verrall.
- 116f. Pathologic Histology. A study of the histological changes in diseased plants. Lectures, laboratory, and reference work. Prerequisite: Course I or 10. Three credits. MWF III, IV; 106,107PP. Mr. Leach.
- 117s. Diseases of Forage and Fiber Crops. Symptomatology, etiology, and methods of control. Lectures, laboratory, and field work. Prerequisite: Course I or 10. Three credits. MWF III, IV; 106-107PP. (Given in alternate years; offered in 1929-30.) Mr. Rodenhiser.
- 118f. Bacterial Diseases of Plants. Bacteria as plant pathogenes; representative types with particular reference to the technique used in studying bacterial diseases of plants. Lectures, laboratory, and greenhouse work. Three credits. Prerequisites: Course I or 10 or Bact. 51. Ar. Mr. Leach.
- 119s. Principles of Plant Disease Control. Methods of plant disease control by means of exclusion, eradication, protection, and immunization. Lectures, laboratory, and reference work. Prerequisite: Course I or 10. Three credits. Ar. (Given in alternate years; not offered in 1929-30.) Mr. Rodenhiser

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 203f-204w-205s. Research in Plant Pathology. Special assignment of work in laboratory and field problems in pathological research. Mr. Freeman, Mr. Stakman, Mr. Leach, Mr. Christensen, Mr. Rodenhiser, Miss Dossdall.
- 207f-208w-209s. Research in Mycology. Research work along following suggested lines: taxonomy of natural groups; fungous flora of particular regions, localities, or habitats; investigation of fungi involved in special industrial or natural processes; morphology or physiology of special forms. Prerequisite: Course 105-106-107. For minor or major. Three credits per quarter. Mr. Freeman, Mr. Stakman, Miss Dossdall.
- 211w. History of Plant Pathology. Development of important mycological, pathological, and physiological researches; historical basis of modern science of plant pathology. Two credits per quarter. Mr. Stakman.
213. Seminar. Assigned topics with special reference to current pathological problems. Historical review of literature on special problems and critical study of current literature. Two credits per quarter. Ar; 400PP. Mr. Stakman.
- 214w. Principles of Pathology. Physiology of plant pathogenes; pathological plant anatomy, parasitism, biologic specialization, resistance, and immunity. Prerequisites: Course 1 or 10 and Bact. 51. Three credits. MWF III, IV; 400PP. Mr. Stakman, Mr. Rodenhiser.

## POLITICAL SCIENCE

Professors William Anderson, Morris B. Lambie, Harold S. Quigley, Jeremiah S. Young; Associate Professor Oliver P. Field; Assistant Professors Lennox A. Mills, Allan F. Saunders.

*Prerequisites.*—For major work, 18 credits; for minor work, 13 credits.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w.† Constitutional Law. I. Constitutional basis of federal-state relations; interstate relations; powers of the national government; interrelations of national government departments. II. Government and the individual; citizenship and suffrage; constitutional protection of the individual and his property. MWF VI; 221OL. Mr. Field.
- 103s. State Constitutional Law. Characteristics, adoption, and amendment of state constitutions; organization, powers, and relations of the major departments; suffrage and elections; the state bills of rights. MWF VI; 221OL. Mr. Field.
- 104f. Problems in State Government. Special attention to Minnesota government, coupled with an intensive comparative study of one major activity in a number of states. TThS I; 221OL. Mr. Field.
- 105f-106w.† American Constitutional Development. Topical and chronological study of the constitutional development of the United States as a federal state: colonial origins; the first state constitutions; formation of the federal constitution; organization of the new government;

- and the expansion of national powers by amendment, usage, judicial interpretation, the exercise of a quasi-police power, and federal aid to the states. MWF II; 111OL. Mr. Young.
- 107f. Recent Social Legislation. Governmental powers and methods used for social legislation, both state and federal; peace and security; safety and health; public morals; semi-social economic relations, social advertising, minimum wage, city planning, police power restrictions on use of private property. TThS II; 211OL. Mr. Young.
- 108w. Legislative Power and Methods. Source and scope of the legislative power; methods used by legislative bodies; current political questions; formulation and defense of legislative bills. (Not offered in 1929-30.)
- 109s. Government and Business. Governmental powers; restraint of trade and manipulation of prices; protection of debtors; business affected with a public interest; combinations of laborers; corporations; compulsory benefits; conservation of natural wealth; vested rights; confiscatory legislation. TThS II; 211OL. Mr. Young.
- 113s. Administrative Law. The nature and scope of administrative law with special reference to the law of officers and special administrative tribunals. TThS I; 221OL. Mr. Field.
- 116s. Municipal Powers and Functions. A study of the constitutional status; the common law attributes; the creation, alteration, and dissolution; the organization, officers, and procedure; the corporate and governmental powers; and the expanding functions of municipal corporations. (Not offered in 1929-30.)
119. Jurisprudence. (See Law School program.) Mr. Rottschaefer.
- 131f-132w.† Principles of Public Administration. Source of the administrative power; administrative areas; the budget; personnel; purchasing; organization; public service as a career. MWF II; 12Lib. Mr. Lambie.
- 133s. Problems of Public Administration. Special problems relating to education, finance, safety, health, welfare, commerce, labor, and conservation of natural resources. MWF II; 12Lib. Mr. Lambie.
- 137w. Municipal Administration. Administrative organization, personnel, and finance; planning, public works, safety, sanitation; utilities. MTWFS III; 112OL. Mr. Anderson.
- 145w-146s.† Comparative Federal Government. Analysis of the federal elements found in such foreign governments as Canada, Australia, Germany, and Switzerland, to evaluate American practice. MF 3:30-4:45; 12Lib. Mr. Saunders.
- 149f-150w.† Government and Politics of the British Empire. Organization, working, and international status of the Imperial and Dominion governments. MWF VI; 211OL. Mr. Mills.
- 153f-154w.† Far Eastern Government and Politics. The constitutional development of Japan and China; government, parties, and political problems. (Not offered in 1929-30.)
- 161w-162s.† Current Political Thought. A study of present-day schools of political thought, and of the manner in which they view the central problems of sovereignty, liberty, political obligation, and the functions and organizations of the state. TS and ar. IV; 209OL. Mr. Anderson.

- 163f. American Political Ideas. Intensive study, biographically or topically, of selected theoretical aspects of American political life. MF 3:30-4:45; 12Lib. Mr. Saunders.
- 165w. Development of Political Thought. (See Philosophy 129.) TWThFS I; 322F. Mr. Wilde.
169. Problems of Democracy. An examination of a few key problems of a democratic society—individual and class differences, opinion, dictatorships, expert knowledge, and leadership. (Not offered in 1929-30.)
- 171s. Political Psychology. A biological and psychological approach to political theories and problems. The political significance of individual differences in intellect and temperament in relation to belief, propaganda, and public opinion. (See Psychology 141.)
175. Political Parties. The nature, function, organization, and methods of political parties; legal control of parties and elections; public opinion as a factor in popular government. (Not offered in 1929-30.)
- 181f-182s.†\* International Law. Nature, sources, and sanction of international law. The laws of peace, war, and neutrality. MWF IV; 209OL. Mr. Quigley.
- 183s. International Organization. Systems of international relations, international administrative organizations, and political guarantees of the past with a detailed study of the League of Nations. (Not offered in 1929-30.)
- 184s. Problems in International Law. Intensive study of the solution of selected international controversies by national and international courts, arbitration tribunals, and diplomatic conferences. (Not offered in 1929-30.)
- 187f-188w.† American Diplomatic History. The history, principles, and policies of American diplomacy. MWF III; 221OL. Mr. Shippee.
- 189s. Topics in American Foreign Relations. Such topics as the Monroe Doctrine, freedom of the seas, the "open door," arbitration and disarmament will be considered with particular reference to the future policy of the United States. TTh VIII, IX; 339Lib. Mr. Shippee.
- 191f-192s.†\* Far Eastern Diplomacy. The international relations of China from the earliest period; early contacts between Japan and China; the policy of exclusion gradually overcome by western powers; the opening of the Far East in the nineteenth century; the open door policy; the contemporary situation. MWF VII; 209OL. Mr. Quigley.
- 193s. Problems of the Pacific. Intensive study of selected problems, varying from year to year, in the political and constitutional developments, or in foreign relations, of Far Eastern countries. (Not offered in 1929-30.)
- 195s. Colonization. The economic and political factors in colonization; forms of government, commercial policies, and mandates. MWF VI; 112OL. Mr. Mills.

\* In 1929-30 only, this course will run in fall and spring instead of fall and winter quarters.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s.† Seminar in Public Law. Mr. Anderson, Mr. Young, Mr. Field.
- 211f-212w-213s.† Seminar in Modern Government and Political Theory. Mr. Anderson, Mr. Mills, Mr. Saunders.
- 221f-222w-223s.† Seminar in Local Government and Administration. Mr. Anderson, Mr. Lambie, Mr. Saunders.
- 231f-232w-233s.† Seminar in Internal Relations. Mr. Quigley, Mr. Mills.

## PSYCHOLOGY

Professors Richard M. Elliott, John E. Anderson, Donald G. Paterson; Associate Professors Charles Bird, Edna F. Heidbreder; Assistant Professors William T. Heron, Kate Hevner, Miles A. Tinker.

*Prerequisites.*—For either major or minor work, 12 credits.

- 101f-102w†-103s. Experimental Psychology. The theory and technique of the leading methods of experimental investigation in human psychology. Individual minor research problems in the second and third quarters. One lecture, four laboratory hours per week. Six or nine credits. MWF VII; WF VIII; 116Psy. Mr. Tinker.
- 108f. Systematic Psychology. A comparative study of the problems, methods, and viewpoints of modern psychology. Three credits. TThS III; 109Psy. Miss Heidbreder.
- 109f,w. Readings in Psychology. Intensive study of selected topics such as attention, perception, imagination, thinking. For properly qualified students with special interests. Three credits. Ar. Miss Heidbreder.
- 114w-115s.† Human Behavior. An analysis of the development and organization of human behavior. Consciousness or mind, as a property of the living body, is discussed in its dependence upon response. Six credits. TThS II; 115Psy. Mr. Elliott.
- 124f. Psychology of Learning. A study of the literature and experiments of memory and habit formation. Lectures, readings, and reports. Three credits. MWF IV; 109Psy. Mr. Heron.
- 125f-126w†-127s. Psychology of Individual Differences. Experimental and statistical study. Influence of sex, race, immediate ancestry, environment, maturity in the causation of individual differences. Investigation of definite problems and analysis of results. Individual minor research problems in third quarter. Six or nine credits. MWF II; 115Psy. Mr. Paterson.
- 130s. Vocational Psychology. Psychology of individual differences in intelligence, aptitudes, interests, and training, with special reference to vocational guidance. Two credits. F IX-X; 301F. Mr. Paterson.
- 137s. Psychology of Learning. A continuation of 124f, which is prerequisite. Three credits. TThS III; 109Psy. Mr. Heron.
- 140w. Social Psychology. A critical study of the experimental investigations of group behavior including the social significance of instinct, habit, imitation, suggestibility, and personality traits. Three credits. TThS III; 115Psy. Mr. Bird.

- 141s. Political Psychology. A biological and psychological approach to political theories and problems. The political significance of individual differences in intellect and temperament in relation to belief, propaganda, and public opinion. Three credits. TThS III; 115Psy. Mr. Bird.
- 144w-145s.† Abnormal Psychology. Normal and abnormal behavior contrasted. Varieties of maladjustment as illustrated in criminality, deficiency, fanaticism, and insanity. Stress will be laid on the inadequacies of personality as shown in everyday life. Six credits. MWF IV; 133Ph(w), 166Ph(s). Miss Heidbreder.
- 151f-152w†-153s. Animal Psychology. Vertebrate behavior is emphasized. A critical study of the literature, and of the relationship between animal and human psychology. Individual investigation of special problems in the second and third quarters. Six or nine credits. MWF VI; ar. Mr. Heron.
- 160f. 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. MWF VI; 115Psy. Mr. Longstaff.
- 168w. Perception of Space. An intensive study of visual, auditory, and somaesthetic space perception. Lectures, readings, and a special report or investigation. Three credits. TThS II; 109Psy. (Offered in 1930-31.) Mr. Heron.
- 172f. Reaction Time. The factors which influence reaction time. The significance of reaction time as a measure of complicated neuromuscular activity. Lectures, readings, and a special report or investigation. Three credits. TThS II; 109Psy. Mr. Heron.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 200f-201w-202s.† History of Psychology I. Origin and development of scientific psychology. Men, schools, and methods. Emphasis on the experimental period, 1860 to the present. Open to advanced students with permission of instructor. One credit per quarter. T I; 116Psy. (Given in alternate years; offered in 1929-30.) Mr. Tinker.
- 203f-204w-205s.† History of Psychology II. Psychology in America. Development of laboratories, departments, apparatus, texts and journals. Present status. Open to advanced students with permission of instructor. One credit per quarter. T I; 116Psy. (Given in alternate years; offered in 1930-31.) Mr. Tinker.
- 206-207-208. Research in Animal Behavior. Mr. Heron.
- 210f-211w-212s. Research Problems. Laboratory investigations. Open to graduate students only. Mr. Elliott, Mr. Anderson, Mr. Paterson, Mr. Bird, Miss Heidbreder, Mr. Heron, Mr. Tinker.
- 215f-216w-217s.† Seminar in Psychology. Fortnightly meetings attended by teaching staff and advanced students for discussion of some of the fundamental problems of behavior and for reports of research in progress. Attendance of graduate students who are candidates for degrees is re-



- quired. One credit per quarter. Alternate Thursdays 7:15-9:15 p.m. 301Psy. Mr. Elliott.
- 220f-221w-222s.† Journal Club. Advanced students meet every other week for reports on current publications and discussion of contemporary trends in psychology and related sciences. Attendance of graduate students who are candidates for degrees is required. One credit per quarter. Alternate Thursdays 7:15-9:15 p.m. 301Psy. Mr. Paterson.
230. Advanced Differential Psychology. Three credits. Ar. Mr. Paterson.

## ROMANCE LANGUAGES

Professors Everett W. Olmsted, Francis B. Barton, Irville C. LeCompte, Colbert Searles, Edward H. Sirich; Associate Professor Carlos V. Arjona; Assistant Professor Elizabeth Nissen.

*Prerequisites.*—For major work, 27 senior college credits or equivalent; for minor work, 18 senior college credits or equivalent. Candidates for Master's degree must also have a reading knowledge of at least one other modern language. Candidates for the Doctor's degree must have had at least two years' work in Latin, and are required to take also the course in medieval Latin in the Latin Department. A reading knowledge of a second Romance language and of German is also required.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

## FRENCH

- 100s. French Oral Diction. Practical and theoretical study of spoken French. MTWF VIII; 203F. Miss Guinotte.
- 103f-104w-105s.† French Syntax and Composition. Special studies in characteristic problems of French syntax. F VI; 217F. Mr. Barton.
- 115f. French Literature: Seventeenth Century: Formation of the Classic Ideal. MTWF IV; 205F. Mr. Searles.
- 116w. French Literature: Seventeenth Century: Molière, Racine, LaFontaine. MTWF IV; 205F. Mr. Searles.
- 117s. French Literature: Seventeenth Century: Moral and Didactic Literature. MTWF IV; 205F. Mr. Searles.
- 118f-119w-120s. French Literature: Eighteenth Century. First quarter: beginnings of the philosophic movement, Bayle, Montesquieu, Diderot; second quarter: Voltaire; third quarter: Rousseau, the theater, the novel. TThS III; 217F. Mr. Sirich.
- 121f-122w-123s. French Literature: Sixteenth Century. First quarter: the Rhétoriciens, Marot, Rabelais; second quarter: the Pléiade; third quarter: Montaigne, Amyot. M VIII-IX; Th VII; 203F. Mr. Searles, Mr. Sirich.
- 145w-146s. Explication de Textes. TTh VII; 203F. Mr. Boyer.
- 150f-151w-152s. French Dramatic Literature. A study of the development of dramatic literature in France from the classical period to the present time. TTh III; 203F. Mr. Olmsted.
- 153s. French Lyric Poetry. Contemporary French poets. MTWF VI; 217F. Mr. LeCompte.

- 157w. Modern French Novel: Bourget, Loti, France, etc. MTWTh VI; 217F. Mr. Boyer.
- 171f-172w-173s.† History of the French Language. Lectures and illustrative texts giving the development of the French language from its origins to the nineteenth century. Especially intended for prospective teachers. Th VIII; 203F. Mr. LeCompte.
- 174f-175w-176s. Contemporary French Novel and Drama. Lectures in French. TTh IX; 201F. Mr. Boyer.

## SPANISH

- 110f-111w-112s. Spanish Literature: Nineteenth Century. MWF IV; 108F. Mr. Arjona.
- 115-116-117. Spanish Literature: Seventeenth Century. First quarter: the drama; second quarter, the novel; third quarter, lyric and epic poetry. Alternates with 156-157-158. (Not offered in 1929-30.)
- 141s. Modern Spanish Novel. (Alternates with 150.) MTThF VII; 102F. Mr. LeFort.
150. Modern Spanish Drama. (Alternates with 141.) (Not offered in 1929-30.)
- 156f-157w-158s. Spanish Literature: Sixteenth Century. First quarter, the drama; second quarter, Cervantes and the novel; third quarter, poetry, the mystics. Alternates with 115-116-117. TThS II; 305F. Mr. Arjona.
- 174f-175w-176s. Lectures in Spanish: Twentieth Century Literature. First quarter, the drama; second quarter, the novel; third quarter, poetry. TTh IX; 202F. Mr. Arjona.

## ITALIAN

- 159f-160w. Dante. The *Divina Commedia*. (Alternates with 161-162.) MWF II; 217F. Miss Nissen.
- 161-162. The Sixteenth Century. Reading of texts and study of literary influences. (Alternates with 159-160.) (Not offered in 1929-30.) Miss Nissen.
- 164s. Dante (in English). Lectures, reading, and discussion of the *New Life*, and parts of the *Divine Comedy*. TThS II; 212F. Miss Nissen.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201f-202w-203s. Old French Phonology and Morphology. Lectures on the origin and development of the French language, with practical exercises and reports on assigned topics. Six credits. F VIII, IX. Mr. LeCompte.
- 204f-205w-205s. Reading in Old French Literature. An introductory course in the reading of Old French. Different types of literature will be read and their origin and development discussed. A certain amount of collateral reading required. Three credits. F VII. Mr. LeCompte.
- 207f-208w-209s. Old Provençal. Reading in early Provençal literature with special attention to the poetry of the troubadours. Six credits. S III, IV. Mr. LeCompte.

- 222f-223w-224s. French Seminar. Six credits. W VIII, IX. Mr. Searles, Mr. Sirich.
- 230-231-232. Research Methods and Material. Three credits.
- 241f-242w-243s. Old Spanish Philology. Two credits.
- 244f-245w-246s. Old Spanish Literature. Every year a different genre is studied, such as the epic. Subject to be decided by agreement of students. Two credits.
- 250f-251w-252s. Spanish Seminar. Six credits.
- 259f-260w-261s. Research in Romance Languages. Credit depends upon amount of work accomplished.

## SCANDINAVIAN

Professor Andrew A. Stomberg.

*Prerequisites.*—For major work, 18 credits; for minor work, 6 credits in the department. All required foreign language credits for the Master's degree in this department may be in either Norwegian, Swedish, or Danish.

Because of changes in the staff no graduate work in Norwegian is offered in 1929-30.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w-103s. Modern Norwegian Literature. From 1814 to the present day. Prerequisites: Scandinavian 1-2 and 3-4. Nine credits. TThS II; 110F.
- 104f-105w-106s. Modern Scandinavian History. Knowledge of Scandinavian not required. Nine credits. MWF IV; 206F. Mr. Stomberg.
- 107f-108w-109s. Modern Swedish Literature. The Swedish novel. Study of a selected list of Swedish classics. Nine credits. MWF V; 205F. Mr. Stomberg.
- 110w. Ibsen. Prerequisite: Scandinavian 101-102-103. Three credits. Ar; 110F.
- 111f-112w-113s. Old Norse (Icelandic). Grammar and reading. Gunnlaug's Saga Ormstungau. Six credits. Ar.
- 114f. Strindberg. Prerequisite: Scandinavian 107f-108w-109s. Three credits. Ar. Mr. Stomberg.
- 117s. Earlier Norwegian Literature. Prerequisite: Scandinavian 4-5. Five credits. MTWFS III; 206F.
- 130-131-132. Danish Literature of the Nineteenth Century. From Oehenschläger to the present time. Nine credits. (Not offered in 1929-30.)
- 134f-135w. The Landsmaal Movement. From Aasen to Garborg. Six credits. (Not offered in 1929-30.)
- 136s. Björnson. A study of his activity as a central figure in modern Norway. Three credits. MWF II; 110F.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201-202-203. Seminar in History of Scandinavian Languages.
- 209-210. Seminar in Modern Swedish Languages and Literature. The course is based upon Schuck and Warburg's *Illustrated Svensk Litteraturhistoria* and includes a study of special authors. Nine credits. Mr. Stomberg.

215-216-217. Seminar in Norwegian Literature. The various phases of the cultural development of modern Norway are discussed. The complete works of Björnson or Ibsen are especially studied. Also Holberg and the eighteenth century.

### SOCIOLOGY AND SOCIAL WORK

Professors Edwin H. Sutherland,<sup>1</sup> Pitirim A. Sorokin, Wilson D. Wallis (Anthropology), Malcolm M. Willey, Carl C. Zimmerman; Associate Professor Ross L. Finney; Assistant Professor Gustave A. Lundquist.

*Prerequisites.*—In sociology: for major work, 18 quarter credits; for minor work, 12 credits. In Medical Social Work: Elementary courses in General Zoology, Physiology, Economics, Political Science, Psychology, and Sociology. In addition the following courses in sociology: Statistics, Elementary Case Work, Field Courses, and Social Protection of the Child.

#### COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 100f. Social Psychology. Primarily for sociology students. The social attitudes; their development and modification under social pressure; the interactions of individuals and groups. TThS II; 109OPh.
- 101w. Social Organization. The organization and structure of social groups; the basic social processes of differentiation, stratification and mobility. Integration and disintegration of social groups and institutions. Essentials of social dynamics. TThS II; 109OPh. Mr. Sorokin.
- 102s. Social Control. An examination of the concept historically, and a restatement in cultural terms, with extended consideration of the extent to which the individual is passively controlled by his culture and the extent to which he can reshape it. MWF II; 109OPh. Mr. Willey.
- 103s. Sociology of Conflict. Types of social conflict and their rôle in social life. MWF II; 2cOph. Mr. Sutherland.
- 110f. 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. MWF V; 104OPh. Mr. Zimmerman.
- 112w. The Rural Social Survey. A course dealing with the methods and content of rural social research. All methods of investigation are analyzed. Especially designed for those interested in social research under Purnell or similar funds. MW V; 104OPh. Mr. Zimmerman.
- 114s. Rural Social Institutions. A detailed study of the problems of organization and efficiency of selected rural institutions, especially religious, educational, civic, and recreational. For advanced students. Lectures, discussions, reports. MWF I; 105AgE. Mr. Lundquist.
- 116w. The Newspaper as a Social Institution. A study of the social rôle of the newspaper in the United States, with special reference to the social changes that have influenced the press, and the corresponding influences of the press upon social life. MWF IV; 104OPh. Mr. Willey.

<sup>1</sup> Absent on leave, 1929-30.

- 119f. The Family. The evolution of the family; development of family unity or disunity; the rôles of the several members of the family; methods of investigation of the family. TThS III; 104OPh. Mr. Sutherland.
- 120f. Social Progress. A history of the theories of progress and a critique of the idea of progress. MWF II; 109OPh. Mr. Sorokin.
- 121w. Advanced Statistical Methods. The analysis and interpretation of social data by application of the theory of errors, the theory of probability, the theory of sampling, partial correlation, and the analysis of time series. MWF VII; 2cOPh.
- 122w-123s. Methods of Social Investigation. The nature of scientific method; the problems of sociology; specific methods of investigation of social phenomena. MWF VIII; 109OPh. Mr. Sutherland.
- 126s. The Technique of Leadership in Group Work. An advanced course for prospective executives in settlements and program agencies. TThS I; 104OPh. Miss Mead.
- 128s. Principles of Administration Applied to Social Work. A technical study of methods of organizing charitable agencies, of financing them, and of making the public aware of their work. Lectures and practice work. Th VIII, IX; 109OPh. Mr. Bradley.
- 130s. Advanced Case Work. The method of case work in some special applications to specific problems presented by the socially inadequate; conducted by case conferences and case studies. T VIII, IX; 109OPh.
- 132s. Juvenile Courts and Probation. Primarily a course in probation practice work, but prefaced by lectures on the social and legal aspects of the juvenile courts and probation. (Not offered in 1929-30.)
- 133f. Social Case Work in Health Problems. A course open only to students who are properly grounded in case work. S III, IV and ar.; 4aOPh. Miss Gardiner.
- 134s. Legal Protection of the Child. A study of the relation of law to child welfare. A survey of existing children's protective legislation, of its administration and its future development. MWF I; 2cOPh. Mr. Waite.
- 135s. Field Practice in Legal Protection of the Child. Designed to meet the individual needs of students in the course on Legal Protection of the Child. Ar.
- 138w-139s. Mental Case Work. A study of the intellectual and emotional factors in human adjustment and their significance in case work. S III, IV and ar; 104OPh. Miss Leahy.
- 140w. 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. MWF II; 109OPh. Mr. Sorokin.
- 141s. Contemporary Social Theory. An intensive study of developments in the social theory of the late nineteenth and twentieth centuries. TThS II; 109OPh. Mr. Sorokin.

- 152s. Seminar. Problems of Institutional Administration. (Not offered in 1929-30.)
- 153f-154w-155s. Advanced Field Training in Group or Case Work. May be taken in specialized fields of child welfare and medical, as well as family, work. Ar.
- 158w. The Sociology of Revolution. MWF III. (Not offered in 1929-30.)
- 160f. Population Problems. MWF III; 4aOPh. Mr. Sorokin.
- 187f,w,s. Seminar in Educational Sociology. A discussion of the sociological foundations of educational theory, with investigation of special problems. S I, II; 206OL. Mr. Finney.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 200f-201w-202s. Seminar in Applied Sociology. Mr. Sutherland.
- 203f-204w-205s. Seminar in Social Theory. Mr. Sorokin.
- 206f-207w-208s. Seminar: Statistical Theory in Relation to Social Theory and Practice. T 4:00-6:00 p.m.
- 209f-210w-211s. Seminar: The Theory of Social Evolution: The Cultural Approach to Sociology. (Instructors in the introductory course are required to take this seminar in the fall quarter.) Mr. Willey.
- 215f-216w-217s. Seminar in Rural Sociology. Mr. Sorokin, Mr. Zimmerman.
- 218f-219w-220s. Seminar in Social Work. Miss Gardiner, Miss Mead, Miss Leahy.
- 221f-222w-223s. Graduate Field Training. Twelve hours per week each semester.
- 224f-225w-226s. Medical Social Work. Principles and methods of Medical Social Case Work. Interrelations within medical institutions and with the community. The organization and development of social work in hospitals and dispensaries, its trends and scope. Open only to full-time students who wish to specialize in medical social work. Three hours a week. Ar. Miss Gardiner.
- 227f-228w-229s. Advanced Graduate Field Training. Twelve hours a week each quarter. Mrs. Mudgett, Miss Gardiner.

## SOILS

Professor Frederick J. Alway; Associate Professor Clayton O. Rost; Assistant Professor Paul R. McMiller; Instructor Constantine C. Niki-foroff.

*Prerequisites.*—For major work, at least two years of work in chemistry, including both quantitative analysis and organic chemistry, and one year of work in general physics. A reading knowledge of French or German is required for the Master's degree. In certain cases where some other modern foreign language would be more valuable in connection with the thesis it may be substituted.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f. Chemical Analysis of Soils. A laboratory course on the chemical examination of soils, including both fusion and extraction methods for

- mineral nutrients. Prerequisites: Soils 4 and 5 and quantitative analysis. Five credits. MWF 1:30-5:20; 103Ch. Mr. Rost.
- 102f,w,s. Special Problems in Soils. Individual laboratory or field work upon some special soil problem in soil physics, soil chemistry, or soil management. Arrangements must be made in advance. Prerequisites: Soils 4 and 5, and other courses according to problem selected. Three to five credits, according to work. 103Ch. Mr. Alway, Mr. Rost.
- 104s. Soil Surveying. Field practice in surveying soils and the preparation of soil maps. Prerequisites: Soils 4 and 5. Three credits. Mr. McMiller.
- 107w. Fertilizers and Manures. Sources, composition, and uses of the various fertilizers, manures, and soil amendments. Lectures and laboratory work. Prerequisites: Soils 4 and 5. Two credits. TS IV; 204Ch. Mr. Rost.
- 108w. Physical Properties of Soils. A laboratory course on the determination of physical constants of soils, including mechanical composition. Prerequisites: Soils 4 and 5. Three credits. TTh 1:30-5:20; 204Ch. Mr. McMiller.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201w. Classification of Soils. Fundamental requirements of classification. Different systems of soil classification. Soil forming factors. Soil morphology, genesis, geography and cartography. Lectures and readings. Prerequisites: Soils 4, 5, 101, and 108. Three credits. TThS. Mr. Nikiforoff.
- 202f,w,s. Research in Soils. The investigation in the field, in the laboratory, or in both, of soil problems. The particular problem which a student may select will depend upon his previous training in agronomy, botany, chemistry, geology, and physics. Credit, according to work. Mr. Alway.
- 203w. Seminar in Soils. Review of current literature; presentation and discussion of papers on research; study of methods of investigation of soils. Required of graduate students. One credit. T VII; 204Ch. Mr. Alway.

## SPEECH

Professor Frank M. Rarig,<sup>1</sup>

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101f-102w. Advanced Speech Composition. Structure and oral style. Psychology of persuasion. Briefing. Critical study of models. Written speeches. Reports. Prerequisites: Speech 41-42-43 or 45-46; Psy. 1-2; 10 credits in soc. sci. Six credits. MWF III; 308F. Mr. Rarig.
- 105s. Theory of Reading and Acting. The forms of literature; literature regarded as an art; psychology of creative imagination; speech elements in literature; technique governing use of auditory and visual symbols.

<sup>1</sup> Mr. Rarig will act as adviser for all graduate students in speech.

- Collateral readings, speech problems, reports, term papers. Prerequisites: Speech 41-42-43 or 45-46; 81-82-83; Psy. 1-2. Three credits. MWF III; 308F. Mr. Rarig.
- 121f-122w. Advanced Speech Problems. Factors determining the behavior of speakers and audiences. Prerequisites: Speech 41-42-43 or 45-46; Psy. 1-2. Recommended: Psy. 114-115; Anat. 4. Six credits. TThS III; 409F. Mr. Holmes.
- 141f-142w-143s. Introduction to Laboratory Research. The study of vocal sound; methods of analysis and synthesis. The study of hearing. Experimental methods applied in individual research projects. Readings, reports, experiments. Prerequisites: Speech 41-42-43 or 45-46; Psy. 1-2; 4-5 or 7. Nine credits. Mr. Holmes.
- 162w-163s. Advanced Speech Correction. The physiological and psychological aspects of organic and functional speech problems. Theories of stuttering. Diagnoses, case histories, and treatment of speech cases. Observation of clinical diagnosis and treatment. Prerequisites: Speech 41-42-43 or 45-46; 61; 67; Psy. 1-2. Six credits. Mr. Bryngelson.

#### COURSES PRIMARILY FOR GRADUATE STUDENTS

- 207f-208w-209s. Seminar in Orators. A critical study of the great English and American orators. One historical period each quarter. Prerequisites: Speech 41-42-43 or 45-46; 101-102; Psy. 1-2; 140; 10 cred. in soc. sci. Six credits. Mr. Rarig.
- 261f-262w-263s. Seminar in Speech Correction. A study and critical analysis of current literature in the field of speech pathology. Each student works out a short thesis problem in connection with his studies in speech correction. Studies in new theories and clinical procedures. Specific cases presented for group study. Prerequisites: Speech 41-42-43 or 45-46; 61; 67; 121-122; 162-163; Psy. 1-2. Six credits. Mr. Bryngelson.
- 291f-292w-293s. Research and Thesis. Open to graduate students who are engaged on thesis projects. Six credits. Mr. Rarig, Mr. Holmes, Mr. Bryngelson.

#### SURGERY

(Including divisions of General Surgery, Experimental Surgery, Orthopedic Surgery, Urology, and Dental Surgery)

For staff and courses of study offered, see special bulletin of graduate work in medicine.

#### VETERINARY MEDICINE

Professor Clifford P. Fitch.

*Prerequisites.*—For major work, 12 credits; for minor work, 6 credits in the department.



## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 101w-102s. Advanced Anatomy of Domestic Animals. Advanced study of the structures involved in the type, conformation, and nutrition of the common farm animals. Dissection of farm animals, including a study of the osseous, muscular, and other principal anatomical structures. Mr. Kernkamp.
- 103f-104w. Advanced Comparative Physiology. An advanced course in physiology of the domestic animals, including laboratory work with special emphasis on animal nutrition. Mr. Hewitt.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 205f-206w-207s-208su. Veterinary Pathology and Bacteriology. Advanced problems. Specially adapted to meet the needs of graduate students. Offered as major or minor work. Credits to be arranged. Mr. Fitch.

## ZOOLOGY (ANIMAL BIOLOGY)

Professors William A. Riley, Royal N. Chapman, Hal Downey, John B. Johnston, Dwight E. Minnich, Charles P. Sigerfoos,<sup>1</sup> Jerry E. Wodsedalek; Associate Professor Adolph R. Ringoen; Assistant Professors Maynard S. Johnson, Clarence E. Mickel.

*Prerequisites.*—For major work, Course 1-2 and at least 18 credits of advanced work approved by the department; for minor work, Course 1-2 or the equivalent.

## COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

- 107f. Protozoology. Lectures, references, and laboratory work on the structure and life histories of Protozoa. Five credits. MTWThF I, II; 211,213Z. Mr. Sigerfoos.
- 109f,110w,111s. Experimental Zoology. A survey of animal behavior from the physiological viewpoint. Lectures, laboratory, reading. Nine credits. MWF IV; 10Z. Mr. Minnich.
- 117w-118s-119su.† Ecology of Insects. General principles of ecology with special reference to the insects of Minnesota. Lectures, laboratory, assigned reading and field work. Nine credits. TTh VI, VII, VIII; 401Z. Mr. Chapman.
- 120su. Advanced Ecology. Similar to Course 117-118-119 with special field work. Five credits. Ar; 202Z. Mr. Chapman.
- 125f-126w-127s.† Advanced Entomology. Morphology and classification of insects, with lectures on the history of entomology. Nine credits. TThS III, IV; 208Z. Mr. Mickel.
- 139-140.† Histology and Development of Insects. Lectures and laboratory work on the histology, embryonic and postembryonic development of insects. Six credits. TTh III, IV and ar; 208Z. Mr. Riley.

<sup>1</sup> Absent on leave, 1929-30.

- 144f-145w-146s. Animal Parasites and Parasitism. Lectures and laboratory work. Origin and biological significance of parasitism; the structure, life history, and economic relations of representative parasites. Second term devoted primarily to the relation of insects to diseases of man and animals. Nine credits. WF VI, VII, VIII; 208Z. Mr. Riley.
- 148f-149w-150s.† Histology and Organology. Comparative study of the microscopic structure of tissues and organs. Textbook, lectures, laboratory. Ar. Mr. Ringoen.
- 181f-182w.† Comparative Embryology. A survey of the principles of animal development dealing with fundamental invertebrate and vertebrate types. Lectures, reference and laboratory work. Six credits. TTh VI, VII, VIII; 201Z. Mr. Ringoen.
- 183.† Genetics and Eugenics. Facts and theories of heredity and the application of the laws governing natural inheritance for the improvement of the race. Three credits. MWF IV; 211Z. Mr. Wodsedalek.
- 197f-198w-199s. Problems. Advanced work in some special line. Nine or 18 credits. Hours and days arranged. Mr. Riley, Mr. Chapman, Mr. Downey, Mr. Johnston, Mr. Minnich, Mr. Sigerfoos, Mr. Wodsedalek, Mr. Mickel.

## COURSES PRIMARILY FOR GRADUATE STUDENTS

- 201-204. Research in Entomology. Hours and days arranged. Mr. Riley, Mr. Chapman.
- 209-212. Research in Economic Vertebrate Zoology.
- 217-218-219. Experimental Zoology. Mr. Minnich.
- 229-232. Research in Animal Histology. Mr. Ringoen.
- 237-238. Research in Animal Cytology. Mr. Wodsedalek.
- 245-248. Comparative Neurology. A study in the structure and functions of the nervous system of vertebrate animals and of the evolution of the chief nervous mechanisms. Prerequisites: two years in comparative or human anatomy. Mr. Johnston.
- 249-252. Research in Neurology. Mr. Johnston.
- 261-264. Research in Parasitology and Medical Entomology. Mr. Riley.

# *The Bulletin* *of the University of* **Minnesota**

*The Graduate School*  
*Announcement of Graduate Work in*  
*Medicine in the Medical School*  
*and the Mayo Foundation*  
**1928-1930**



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1928							1929													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
1	2	3	4	5	6	7	..	..	1	2	3	4	5	..	1	2	3	4	5	6
8	9	10	11	12	13	14	6	7	8	9	10	11	12	7	8	9	10	11	12	13
15	16	17	18	19	20	21	13	14	15	16	17	18	19	14	15	16	17	18	19	20
22	23	24	25	26	27	28	20	21	22	23	24	25	26	21	22	23	24	25	26	27
29	30	31	..	..	..	..	27	28	29	30	31	..	..	28	29	30	31	..	..	..
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<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
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5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24
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2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28
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30	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
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7	8	9	10	11	12	13	7	8	9	10	11	12	13	6	7	8	9	10	11	12
14	15	16	17	18	19	20	14	15	16	17	18	19	20	13	14	15	16	17	18	19
21	22	23	24	25	26	27	21	22	23	24	25	26	27	20	21	22	23	24	25	26
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4	5	6	7	8	9	10	5	6	7	8	9	10	11	3	4	5	6	7	8	9
11	12	13	14	15	16	17	12	13	14	15	16	17	18	10	11	12	13	14	15	16
18	19	20	21	22	23	24	19	20	21	22	23	24	25	17	18	19	20	21	22	23
25	26	27	28	29	30	..	26	27	28	29	30	31	..	24	25	26	27	28	29	30
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<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
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2	3	4	5	6	7	8	2	3	4	5	6	7	8	8	9	10	11	12	13	14
9	10	11	12	13	14	15	9	10	11	12	13	14	15	15	16	17	18	19	20	21
16	17	18	19	20	21	22	16	17	18	19	20	21	22	22	23	24	25	26	27	28
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# UNIVERSITY CALENDAR

1928-29

1928

September	24-October	20		Registration of graduate students
October	1	Monday		Fall quarter classes begin, 8:30 <sup>1</sup> a.m.
October	11	Thursday		Examinations in German and French for candidates for all advanced degrees
November	6	Tuesday		Election Day; a holiday
November	12	Monday		A holiday; (November 11, Sunday, Armistice Day)
November	17	Saturday		Last day for filing thesis subject of candidate for the Master's degree
November	29	Thursday		Thanksgiving Day; a holiday
December	20	Thursday		Commencement Convocation
December	22	Saturday		Fall quarter ends, Christmas vacation begins, 5:20 p.m.

1929

January	7	Monday		Christmas vacation ends, winter quarter classes begin, 8:30 <sup>1</sup> a.m.
January	17	Thursday		Examinations in German and French for candidates for all advanced degrees
February	12	Tuesday		Lincoln's Birthday; a holiday
February	22	Friday		Washington's Birthday; a holiday
March	21	Thursday		Commencement Convocation
March	23	Saturday		Winter quarter ends, spring vacation begins, 5:20 p.m.
March	29	Friday		Good Friday; a holiday
April	1	Monday		Spring vacation ends, spring quarter classes begin, 8:30 <sup>1</sup> a.m.
April	11	Thursday		Examinations in German and French for candidates for all advanced degrees
May	6	Monday		Last day for filing theses of candidates for all advanced degrees
May	30	Thursday		Memorial Day; a holiday
June	1	Saturday		Last day for written examinations for candidates for all advanced degrees
June	5	Wednesday		Last day for oral examinations for candidates for all advanced degrees
June	15	Saturday		Last day for filing bond for publication of Doctor's thesis; last day for depositing binding fee for Master's thesis
June	15	Saturday		Spring quarter closes

<sup>1</sup> First hour classes begin at 8:15 at University Farm.

## GRADUATE WORK IN MEDICINE

June	16	Sunday	Baccalaureate service
June	17	Monday	Fifty-seventh annual commencement
June	20	Thursday	Summer Session, first term begins, 8 a.m.
July	4	Thursday	Independence Day; a holiday
July	15	Monday	Last day for filing thesis of candidates at summer convocation
July	27	Saturday	Summer Session, first term closes
July	29	Monday	Summer Session, second term begins
August	31	Saturday	Summer Session, second term closes

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GRADUATE WORK IN MEDICINE  
ORGANIZATION

The graduate work in medicine in the Medical School and the Mayo Foundation is a part of the work of the Graduate School of the University. Its management is entrusted by the Board of Regents to a committee composed as follows:

The President of the University, Lotus Delta Coffman, Ph.D., LL.D.  
 The Dean of the Graduate School, Guy Stanton Ford, Ph.D., LL.D.  
 The Dean of the Medical School, Elias Potter Lyon, Ph.D., M.D., LL.D.  
 The Director of the Mayo Foundation, Louis B. Wilson, M.D.  
 Clarence Martin Jackson, M.S., M.D., LL.D., of the Medical School  
 Hilding Berglund, M.D., of the Medical School  
 Arthur D. Hirschfelder, B.S., M.D., of the Medical School  
 Frank E. Burch, M.D., F.A.C.S., of the Medical School  
 Donald C. Balfour, M.D., of the Mayo Foundation  
 William F. Braasch, B.S., M.D., of the Mayo Foundation  
 Melvin S. Henderson, M.D., of the Mayo Foundation  
 Leonard G. Rowntree, M.D., D.Sc., of the Mayo Foundation

## GENERAL INFORMATION

The graduate work in medicine here outlined is not intended for those seeking brief practitioners' or review courses. Opportunities of this kind are to be found in the bulletin of the Medical School.

*History.*—In the fall of 1914, the University of Minnesota began graduate work in various fields of medicine and surgery in addition to that already offered for some time in the laboratory branches. The conditions laid down for this work as regards admission, residence, thesis, and examinations were those already applied by the Graduate School in approving all candidates for graduate degrees.

The training of medical graduates for special work in pathology, clinical medicine, and surgery by means of internships, residencies, and assistantships had been developed in the Mayo Clinic at Rochester, until in 1912 definite three-year services in these subjects for graduates in medicine, who had previously had one year's internship in a general hospital, were provided. These services were designated "fellowships," a term intended to cover internships, assistantships, residencies, and so forth. In order to perfect the organization and place the work on a permanent basis, February 9, 1915, a corporation, the Mayo Foundation for Medical Education and Research, was founded by William J. and Charles H. Mayo. On June 9, 1915, the University of Minnesota and the Mayo Foundation for Medical Education and Research entered into an agreement, by the terms of which the funds and income of the Mayo Foundation for Medical Education and Research are devoted, under the direction of the regents of the University of Minnesota, to the promotion of graduate work in medicine and to research in this field. The agreement covered a trial period of six years. On September 13, 1917, the funds and income of the Mayo Foundation were transferred entirely to the regents of the University.

*Purpose.*—In an age of specialization with the development of graduate work in all fields and phases of the sciences, letters, and arts, such educational work needs no elaborate justification. In a subject like medicine, intimately connected with established fields of research such as biology, chemistry, anatomy, physiology, pathology, and bacteriology the need for scientific research and for the training of scientific specialists, investigators, and teachers is as great as in any subject, and of as vital importance.

The possibilities of such work hitherto have suffered less from neglect than they have from the lack of organization, standardization, and certification by the educational institutions which have found it possible and advisable to put such applied subjects as agriculture, education, engineering, and commerce upon a scientific basis, and have freely recognized the accomplishments of trained students by the granting of higher earned degrees in these fields. In medicine in the United States, the leading specialists in practice and the trained productive investigators have usually been developed by long years in internships, minor teaching positions, hospital residencies, or personal apprenticeships to other specialists. A few have obtained their special training in general practice, gradually narrowing to

a particular field. Many men in both groups have broadened themselves by visits to other laboratories and clinics for observation and by longer or shorter periods of foreign study. A much larger body of clinical specialists of varying attainments have been developed by so-called post-graduate or polyclinic medical courses or by the simple and convenient method of self-proclamation.

Taken as a whole, by such undirected processes graduate students are apt to waste time on unessentials and to acquire very inadequate knowledge of many of the essentials. In clinical branches such processes fail to provide any such protection to the public against the untrained specialists or to open any avenue to the public's confidence for the properly trained specialist. And medical education, if it is to advance, must at least be able to supplement a faculty of skilled practitioners with men trained to carry forward the frontiers of medical science.

The objects of this graduate work in medicine are accordingly the training of fully equipped and properly certified specialists for medical practice and of investigators and teachers of medicine.

*Standards.*—In graduate work in medicine the University of Minnesota, in order to secure results and safeguard scientific standards, adopted those general policies and methods already indicated by the established graduate work in other sciences. The development has depended upon the maintenance of real standards of admission; the supply of qualified advisers to graduate students; the provision of adequate laboratory, clinical, and library equipment; and the institution of rigid tests in course and examinations in residence, with evidence of the power of productive research on the part of the student as demonstrated in a thesis.

In doing this work the University of Minnesota is not seeking to multiply the opportunities for securing simply technical training through practitioners' courses. The graduate work is definitely intended to provide opportunities in several years of work for the well-prepared serious-minded student to fit himself in the sciences, as well as in the art, of some special field of medicine or surgery. Entrance upon the work and continuance in it, as well as the holding of scholarships or fellowships in the Medical School or on the Mayo Foundation, will be strictly conditioned upon evidences of power and growth along scientific lines. The value of technical or mechanical skill as a practitioner or operator has its place, but will be subordinated to, and measured by, the power and product of the brain that guides the hand. From the standpoint of both the University and the prospective student it is highly important that this distinction in purpose be kept clearly in mind.

By the present arrangement of courses in arts, science, and medicine a properly prepared student may enter the University, and in seven years secure the usual doctorate degree in arts, in science, or in medicine. The object of the plan pursued at this University since 1914 is to provide three years of additional work on the basis of the degree of doctor of medicine, and leading to the special degree of master of science (M.S.) or doctor of philosophy (Ph.D.) in medicine, in surgery, in pathology, etc.



In clinical branches the degree of master of science is intended primarily to indicate scientific proficiency. To be recommended for this degree the candidate must have given evidence by two or three years of residence that he is competent to begin the practice of a clinical specialty in a scientific manner without the supervision of others. The doctorate of philosophy in clinical subjects will be given only to those men who have not only given evidence of proficiency at least equal to that required for the Master's degree, but who in addition present evidence of well-marked ability to advance medical science.

*Work in public health.*—By the choice of appropriate studies students may prepare themselves to follow various careers in public health work. Graduate students with the proper qualification may prepare themselves to serve as specialists in certain fields of public health work or they may procure a thoro general training with a certain amount of practical experience in public health. Such undergraduate and graduate students as satisfactorily fulfill the requirements of the University will be granted appropriate degrees. Further inquiries concerning the above mentioned courses and curricula should be addressed to Dr. H. S. Diehl, Millard Hall, University of Minnesota.

*Laboratory equipment.*—The laboratory equipment for the prosecution of graduate work in medicine is located in Minneapolis, St. Paul, Rochester, and Pokegama.

The laboratory branches are well housed in excellently equipped buildings on the campus at Minneapolis and at Rochester. Anatomy, chemistry, pathology, and bacteriology are in modern university buildings especially designed for them. Physiology, physiologic chemistry, and pharmacology are located in Millard Hall, a modern building of the best type. The laboratories for experimental medicine and surgery and extensive animal quarters are also in this building. The university museums of anatomy, pathology, and surgery contain a large number of specimens available for teaching purposes.

In Rochester, the laboratories of general pathology, pathologic anatomy, clinical pathology and bacteriology, physiologic chemistry, roentgenology, photography are in the Mayo Clinic Building, as is also the pathologic working museum, which contains over 230,000 specimens. The Institute of Experimental Medicine provides facilities for all experimental work in physiology, pathology, bacteriology, and surgery.

Laboratories of surgical pathology are at St. Mary's, Colonial, Worrell, and Kahler hospitals. The metabolic laboratory is at the Kahler Hospital. Electrocardiographic laboratories are maintained in the Kahler Hospital. A laboratory of physiologic chemistry is at St. Mary's Hospital. A farm for experimental animals is maintained outside the city.

*Clinical equipment.*—The University owns and controls Elliot Memorial Hospital with its service building. This provides a clinic of 300 beds, and has the accumulated hospital records of fourteen years. Nearly 100 beds were added in 1925 by the completion of the Memorial Cancer Institute (a gift from the Citizens Aid Society of Minneapolis) and the Todd

Memorial Hospital. The Out-Patient Department of the hospital is housed in Millard Hall and received 15,067 new patients and 60,894 patients' visits during the year ending June 30, 1927. Additions to the University Hospital are now under construction. These will include the William Henry Eustis Hospital for Crippled Children (about 60 beds), a new Out-Patient Department, and the Students' Health Service. These additions will add about 140 beds to the hospital, making a total capacity of 440 beds.

The State Hospital for the Crippled and Deformed at Phalen Park, St. Paul, offers the University full participation in its clinical opportunities.

The city hospitals of Minneapolis and the Ancker Hospital of St. Paul, representing in all some 1,400 beds, exhibit every phase of clinical service in their wards and amphitheatres. This material, and also that of the new Miller Hospital, St. Paul, is available for graduate work. A graduate fellowship is offered which provides facilities for clinical work in tuberculosis at the Pokegama Sanatorium, under the direction of Dr. H. Longstreet Taylor.

In Rochester St. Mary's, Colonial, Worrell, Curie, and Kahler hospitals have an aggregate of about 1,500 beds with twelve operating rooms for general surgery and six for diseases of the organs of the special senses. All patients are examined clinically in the Mayo Clinic Building and its annexes. In 1927, 73,677 patients were examined. In addition more than 635,000 clinical histories are on file and available for investigative studies. During 1927, 27,183 operations were performed.

Consent for post-mortems is obtained with about 85 per cent of patients dying in the clinic.

The working museum contains more than 230,000 pathologic specimens. All case histories and specimens are classified and arranged so as to be readily available for scientific research.

Arrangements have been made whereby fellows or other graduate students in medicine may divide their time, part of their work being taken in the Mayo Foundation at Rochester and part in the Medical School at Minneapolis and St. Paul.

*Libraries.*—Besides the University Library and the departmental libraries, there are at the disposal of the student the general medical and biological libraries in the new University Library and the Mayo Clinic Building, and the collections of the Hennepin County and Ramsey County Medical Societies. Current issues and complete files of the most important medical periodicals are available in either Minneapolis or Rochester.

*Methods of study.*—Every attempt is being made to establish the graduate work in medicine on a truly university basis. Little class work is done. No short cramming courses are offered. The Mayo Foundation lectures at Rochester and frequent special lectures at the Medical School are given by men who are enthusiastically interested in their particular topics, but each lecturer presumes that his hearers are already well grounded in the fundamentals of his subject. Attendance at these lectures is purely optional with the graduate student. No quizzes are held and no examinations are given on these lectures. The same is true of the clinical and laboratory

demonstrations and departmental seminars. Everything is done to impress the graduate student that his residence is an opportunity for him to find out things for himself and not a period in which he will be instructed by undergraduate methods. The student's work is carefully graded by his immediate chief, whose duty it is to determine the student's ability by daily intercourse with a smaller number of students rather than by class quizzes and formal examinations. Students holding fellowships who do not evince strong personal initiative will not be recommended for annual reappointment, or may be asked to resign their fellowships before the end of their period of appointment. In the arrangement of work the best opportunities will be consistently given to the best qualified men. Low grade and mediocre men will not be permitted to continue to fill appointments to the exclusion of high grade men. Work which receives a grade below B will not be counted for graduate credit in the major field, nor if below C in the minor.

*Registration and number of students.*—All students entering upon graduate work in medicine will register with the dean of the Graduate School. Students who begin their residence work in Rochester may fulfill the preliminary requirements by registering there with the director of the Mayo Foundation. The number of graduate students who will be registered for work is determined by the clinical opportunities and laboratory facilities available. This limitation as a rule does not apply to those majoring in the laboratory departments but arrangements for work should always be made in advance.

*Tuition.*—The tuition fee for the graduate work in clinical medicine and surgery for those not holders of fellowships or otherwise entitled to exemption is \$75 per quarter for residents of Minnesota and \$100 per quarter for non-residents. For students in the fundamental laboratory branches, the tuition fee is \$20 per quarter for residents of Minnesota and \$30 per quarter for non-residents. Extra fees may be charged to cover the cost of materials and supplies for exceptional laboratory experimentation. The special fees for graduate work in the Summer Session are stated in the separate summer session bulletin. Fellows, scholars, and members of the teaching or scientific staff are exempt from tuition, except in the Summer Session.

*Fellowships and scholarships.*—Teaching fellowships in the Medical School are now established as follows: in surgery, 3; in internal medicine, 4; in obstetrics, 4; in ophthalmology and oto-laryngology, 2; in radiology, 2; in mental and nervous diseases, 2; and in pediatrics, 1. These include fellowships in the Minneapolis General Hospital. Fellowships are also available in the University Health Service. They carry a stipend of \$800 the first year, \$900 the second, and \$1,000 the third. These teaching fellows are required to devote their entire time (excepting an annual vacation of three weeks) to graduate work, including a small amount of teaching.

Similar teaching fellowships have been established in the fundamental laboratory department of the Medical School as follows: in anatomy (in-

cluding histology and embryology), 6; in physiology and physiologic chemistry, 3; in pathology, 3; in bacteriology, 2; and in pharmacology, 1. These fellowships carry a stipend of \$900 the first year, \$1,200 the second, and \$1,500 the third year. In some cases the fellowships are for the school year only (September to June), with proportionately smaller stipend. They require a small amount of teaching, the remainder of the time being devoted to graduate work leading to advanced degrees.

In addition, there are at Minneapolis 5 scholarships without stipend, carrying free tuition with opportunity for graduate study in any of the clinical departments.

The attention of prospective medical graduate students is also called to the Shevlin Fellowship in medicine yielding \$500 and tuition. This fellowship permits work in any department of medicine, preference being given to the laboratory sciences. Applications should be in the hands of the dean of the Graduate School before March 1.

The Mayo Foundation carries the following basic and clinical fellowships: in clinical and experimental surgery, 125; in orthopedic surgery, 6; in ophthalmology, 4; in rhinology and oto-laryngology, 12; in obstetrics, 4; in proctology, 3; in dental surgery, 6; in clinical and experimental medicine, 75; in neurology, 4; in dermatology, 8; in urology, 12; in pediatrics, 8; in roentgenology, 4; in pathology, 10; in bacteriology, 2; in chemistry, 2; in physics, 4. The fellowships in clinical branches pay \$800 the first year, \$900 the second year, and \$1,000 the third year. The fellowships in pre-clinical branches pay \$900 the first year, \$1,200 the second year, and \$1,500 the third year. They require full time with an annual vacation of two weeks. During residence in a hospital \$25 per month is deducted from the stipend for board and room.

In addition the Mayo Foundation offers a limited number of fellowships in clinical investigation. These fellowships are specially planned for students who wish to utilize in teaching, research, or practice the advantages derived from thoro study of problems involving prolonged work in pre-clinical sciences. Fellows may spend one, two, or more years in laboratories of the fundamental departments. During this time they may devote their efforts to any type of problem with or without clinical bearing. At least one year is spent in the clinical laboratories of medicine, surgery, or the specialties to emphasize the practical application of research. Clinical contacts are maintained by means of ward rounds, conferences, and seminars. Direct clinical responsibility is arranged when it is necessary for the carrying on of an investigation. The close correlation between the activities of the laboratories and of the clinical services offers unique facilities for such graduate clinical investigation.

The stipends for these fellowships are the same as for those in the basic medical sciences while the fellow is at work in those fields and the same as those in clinical fields while the fellow is at work in those fields.

Nominations for fellowships on the Mayo Foundation are made each quarter, beginning with October 1, for residence to begin three to six months later or as vacancies occur. Each applicant is notified of his

nomination immediately after it is made and his acceptance or rejection thereof requested. In the Medical School appointments are made as vacancies occur.

The Miller Hospital Clinic, St. Paul, supports four clinical fellowships, one each in surgery, medicine, ophthalmology and oto-laryngology, and obstetrics and gynecology. A clinical fellowship in tuberculosis is provided at the Pokegama Sanatorium. Appointments are made as vacancies occur. Apply through the Graduate School.

All appointments are made for one year and are renewable annually for a period of three years upon the basis of satisfactory progress in the work pursued. Requests for blanks for application for fellowships and scholarships should be addressed to the dean of the Graduate School, University of Minnesota, Minneapolis, Minnesota, or to the director of the Mayo Foundation, Rochester, Minnesota.

*Assistantships.*—A few qualified assistants, such as traveling fellows from other universities, officers of the medical corps of the United States Army, Navy, or Public Health Service, et al., designated as special students and not candidates for degrees, may be accepted at Rochester in laboratory and clinical branches for short periods. The number is necessarily limited in order not to interfere with the work of the resident fellows. Correspondence concerning this work should be directed to the director of the Mayo Foundation, Rochester, Minnesota.

Several of the departments in the Medical School (including Anatomy, Physiology, and Pathology) have paid assistantships which may furnish means of self-support while the holder is pursuing graduate work. For further information, address the dean of the Medical School.

*Clinical and class work for visiting or resident practitioners.*—In order that there may be no misunderstanding, it should be stated that the graduate work for a limited number, described above, in no way changes or modifies the opportunities for observation hitherto extended visiting physicians and surgeons by the Mayo Clinic in Rochester, or the arrangements offered in Minneapolis by the Medical School for practitioners who wish to attend such undergraduate medical classes as may be of profit to them without interfering with the regular work of the staff and students of the Medical School. Inquiries concerning these opportunities should be addressed to the dean of the Medical School, Millard Hall, Minneapolis, Minnesota.

*Summary of requirements.*—The various steps involved in the requirements for the degree of doctor of philosophy (Ph.D.) in any one of the clinical or laboratory departments are briefly summarized on pages 16 and 17. The requirements for the Master's degree (M.A. or M.S.) are also indicated. Further information concerning graduate work in general may be found in the general Graduate School bulletin.

*Requirements for advanced degrees in medicine.*—I. Selection. In the selection of graduate medical students, and in making appointments to fellowships for medical graduate work, preference will be given, other things being equal, to students who have an unusually good training in the funda-

mental medical sciences (i.e., anatomy, physiology, pathology, etc.) through which they should make their approach to the specialty which they wish to take as a major subject. Personal interviews with applicants are desirable.

2. Admission. All graduate students are admitted by the dean of the Graduate School. Entrance upon work for the advanced degrees of master of science (M.S.) or doctor of philosophy (Ph.D.) in the clinical departments of medicine is limited to those who have: (a) the Bachelor's degree in arts or science or its equivalent;<sup>1</sup> (b) the degree of doctor of medicine from acceptable institutions (i.e., those in Class A of the American Medical Association); and (c) one year's experience as an interne in an approved hospital or as an assistant in a laboratory in an acceptable medical school. In the fundamental laboratory sciences (anatomy, physiology, bacteriology, pathology, and pharmacology) properly prepared students may be admitted without (b) and (c) as candidates for the Master's degree (M.A. or M.S.) or the Doctor's degree (Ph.D.).

Applicants to be considered for fellowships are expected to read and speak English fluently. Fellows in the Mayo Foundation must pass a satisfactory physical examination including X-ray of the chest after nomination and before being finally accepted.

3. Licensure. Graduate students working in any field of clinical medicine must be licensed to practice in Minnesota within six months after beginning their work in either the Medical School or the Mayo Foundation.

Upon entrance to the Graduate School, the candidate, with the approval of the dean, will select his adviser in the field of his major work. With the approval of his adviser and the dean, he will outline a study program for the year and if possible for the period of residence.

4. Residence. For the Doctor's degree (Ph.D.) at least three full years of successful graduate study are required, including certain special requirements noted below. For the Master's degree (M.S.) in clinical subjects, two or three years are required. For the Master's degree in the laboratory sciences a minimum of one year (three quarters) of residence is required.

5. Language requirements. A reading knowledge of French and German in the field of the candidate's major must be certified by the professors in charge of these languages at least one year before the Doctor's degree is conferred, and before admission to the preliminary examination. The candidate's adviser or his representative is expected to attend this examination and to furnish appropriate literature for the test. For the Master's degree in the laboratory sciences, a reading knowledge of only one foreign language is required, which must be certified before the end of the second quarter of the year in which the candidate expects to present himself for the degree. For the Master's degree (M.S.) in the clinical branches, the language certificate is optional.

<sup>1</sup> Students who have completed at least two years of pre-medical collegiate work, making an equivalent of the seven years combined Arts-Medicine Course at the University of Minnesota, are eligible for admission as graduate students.

6. Study program. The study program for the entire three years must be submitted at the beginning of the second year. This program requires approval by the student's adviser, by the dean, and by the Medical Group Committee. Sufficient research work to train properly the fellow in the principles and methods of scientific investigation and to form the basis of an acceptable thesis is required.

7. Minor. With the approval of his adviser and the dean of the Graduate School, each student upon entrance selects a minor, which must be logically related to his major subject, and (for the Doctor's degree) must be completed by the end of the second year. The minor is preferably a laboratory subject in some other department, and should amount to not less than one sixth of the total work for the degree. At least one sixth of the work offered for the degree in a clinical subject should consist of graduate work in the fundamental laboratory branches, which will serve as a basis for the proposed clinical specialization. This fundamental work should be concentrated in the first part of the course so far as possible. The final examination in the minor for the Doctor's degree is included in the preliminary examination, as noted below. For the Master's degree no special examination is required in the minor, aside from the usual course examinations.

8. Major. The major is that field in which the student desires to specialize. Together with the thesis, the major work should occupy at least two thirds of the total work for the degree. At least one year before attaining the Doctor's degree, the following procedure is required in order that the candidate may become eligible for the preliminary examination. In addition to the completion of the minor work and of the language requirement, he must have the written approval of the department committee (which includes the graduate faculty members) of the major subject. The statement of the department committee should include the subject of the special problem for the thesis, and should certify as to the ability of the candidate to meet all requirements for the degree sought. It should be based on the quality of the candidate's daily work in residence.

9. Certificate of proficiency. Each candidate in a clinical field must have a certificate of proficiency signed by all members of the faculty with whom he has served, stating that in their opinion he is competent to begin the practice of medicine in his major field in a scientific manner without the supervision of others.

10. Admission to candidacy. For the Master's degree, students who have met the language requirement, whose daily work in residence as indicated by quarterly grades has been satisfactory, and whose thesis subject has been properly approved, are admitted to candidacy at the end of the second quarter by vote of the Executive Committee of the Graduate School. For the Doctor's degree, the student is required to pass a preliminary examination, as noted below, before admission to candidacy.

11. Preliminary examination. At least seven months before the Doctor's degree is conferred, a preliminary examination of the student

shall be given by a committee appointed by the dean and including the student's adviser as chairman, a representative of the Medical Graduate Committee (other than the adviser), the head of his major department, a representative of the minor, and such additional members as the dean may consider necessary. Certificates of proficiency in French and German, completion of the minor work, and the recommendation of the major department shall be required before admission to this examination. The examination is in addition to the usual course examinations. It shall cover the graduate work previously taken by the student, and may include any work fundamental thereto. The field of the candidate's specialization and the thesis are reserved for the final examination. The examination is both oral and written, the latter being arranged by faculty representatives from both Minneapolis and Rochester. Only after the successful completion of this examination may the student be enrolled as a candidate for the Doctor's degree. Students failing to pass this preliminary examination shall not be re-examined until at least one quarter has passed.

12. Thesis. Each candidate for an advanced degree (Master's or Doctor's) must submit a thesis. For the Master's degree the subject of the thesis should be filed with the dean of the Graduate School by November 15. The subject must be approved by the adviser and by the Medical Graduate Committee. The topic should be within the field of the major, and the thesis should represent approximately half of a year's work of the student. The thesis must be written in acceptable English. It must show ability to work independently and give evidence of power of independent thought both in perceiving problems and in making satisfactory progress toward their solution. Familiarity with the bibliography of the special field and correct citation of authorities are expected.

The Master's thesis must be typewritten in triplicate, one copy on a special form of linen stock, the other two as carbon copies. Samples of the paper required should be examined in the dean's office. The three copies of the thesis must be filed in the dean's office not later than six weeks before graduation. The thesis will be examined by a committee appointed by the dean on recommendation of the Medical Graduate Committee. Unanimous approval by the thesis committee is necessary for the acceptance of the thesis. If the thesis is accepted, the candidate must deposit with the registrar, at least one week before commencement, the sum of \$1.50 for binding one copy of the thesis, which will be cataloged and deposited in the University Library. An additional copy of the thesis is deposited in the Library for loan purposes.

For the Doctor's degree, a more elaborate thesis is required. The subject is to be stated in the written department recommendation, which precedes the preliminary examination at the end of the second year. The accumulation of material for the thesis should be started much earlier. The thesis must give evidence of originality and power of independent investigation. It must embody results of research forming a real contribution to knowledge and must exhibit a mastery of the literature of the subject and a familiarity of the sources of knowledge. The matter must



be presented with a fair degree of literary skill. The kind of work required in theses for advanced degrees in medicine is exemplified in the volumes, *Papers from the Mayo Foundation and the Medical School*, published by W. B. Saunders Company, Philadelphia, 1921 and 1923.

The thesis must be typewritten in triplicate, to facilitate reading by the thesis committee. The three copies must be filed in the dean's office not later than six weeks before graduation together with a summary or abstract. The dean will appoint a thesis committee with the student's adviser as chairman. Unanimous approval by this committee will be necessary for the acceptance of the thesis. If the thesis is accepted, the candidate must deposit with the registrar, not later than one week before commencement, a sufficient bond to cover the costs of printing as laid down in the regulations adopted June 12, 1922. A copy of these regulations will be furnished on request.

13. Final written examination. In addition to the usual course examinations in all subjects where such are given, the candidate for the Master's degree must pass a final written examination in the field of the major. (No *special* final examination is required in the minor.) The final written examination will be held not later than four weeks before commencement. It is given by the members of the graduate faculty in the major department, the adviser acting as chairman. This examination shall cover all the work done in the major, and may include any work fundamental thereto.

For the Doctor's degree, a final written examination in the major subject is similarly given, after the thesis is presented and at least four weeks before commencement.

14. Final oral examination. If all other requirements for the degree have been met, including the final written examination and the acceptance of the thesis, the final oral examination will be held not less than two weeks before commencement.

For the Master's degree, the adviser will act as chairman of the examining committee, which will include all the instructors with whom the student has taken work, the thesis committee and, ex officio, the head or chairman of the department in which the major work is done. Any member of the graduate faculty may attend as a visitor, and written notice shall be sent by the chairman of the committee to all members of the graduate faculty in the major and minor departments. The final oral examination will cover all the work offered for the degree, and may include other work fundamental thereto. All final examinations for the higher degrees in medicine will include questions on the history of medicine with special reference to the candidate's major field. At the close of the examination, the committee will vote upon the candidate, taking into account all of his work. A majority vote is required for approval.

For the Doctor's degree, the committee conducting the final oral examination will consist of the adviser as chairman, of a majority of the members of the graduate faculty in the major department, and of at least three other members of the graduate faculty appointed by the dean. At least one member of this committee shall be from a group other than the

one in which the major department is included. This examination is to cover the special field of knowledge represented by the major work, including the thesis problem, and shall not exceed three hours. The date of the final oral examination for the doctorate shall be publicly announced, and the examination shall be open to any member of the graduate faculty. Upon completion of the examination, a formal vote of the committee shall be taken and an affirmative vote of at least two thirds of the members shall be necessary for recommendation of the candidate for the degree.

15. Recommendation by the faculty. The dean will report to the graduate faculty the names of those who have completed the requirements for the Master's and Doctor's degrees, and those duly approved will be recommended by the faculty to the Board of Regents of the University. Unless excused by the dean of the Graduate School and the president of the University, all candidates are required to be present at commencement when the degrees are conferred.

A tabular summary of requirements for the Master's degree follows:

WORK	UNDER THE DIRECTION OF	DATE
Program, major and minor	Adviser and dean of the Graduate School .....	On entrance.
Approval of thesis subject	Adviser and group committee	November 15.
Language requirement ....	Adviser and language department .....	Before close of second quarter.
Approval of candidacy ...	Executive committee .....	Beginning of third quarter.
Filing of thesis .....	Dean of the Graduate School	Six weeks before graduation.
Examination of thesis ....	Thesis committee .....	Before admission to final oral examination.
Final written examination in major .....	Major department members of the graduate faculty .	Not later than four weeks before commencement and before final oral.
Final oral examination on all work .....	Thesis committee; all instructors; head of major department .....	Not later than two weeks before commencement.
(Course examinations as required at the usual time.)		
Fee for binding thesis ....	Registrar .....	One week before commencement.

(For the Master's degree in clinical subjects, the dates refer to the last year.)

See tabular summary of requirements for the Doctor's degree below.

WORK	UNDER THE DIRECTION OF	DATE
<b>FIRST YEAR</b>		
Major .....	Adviser and dean of Graduate School .....	
Minor .....		
<b>SECOND YEAR</b>		
Tentative program of entire second and third years' work .....	Adviser, Medical Graduate Committee and dean of Graduate School .....	Before beginning work of second year.
Major, including thesis ..	As for tentative program ..	
Minor .....	Adviser and minor department .....	Before admission to preliminary examination.
Language .....	Adviser and language department .....	
Recommendation .....	By major department ....	
Preliminary examination	Special committee .....	At least 7 months before degree is to be conferred.

GENERAL INFORMATION

WORK	UNDER THE DIRECTION OF	DATE
THIRD YEAR		
Major, including thesis ..	Adviser, Medical Graduate Committee, and dean of Graduate School .....	
Filing of thesis .....	Dean .....	Six weeks before graduation.
Approval of thesis .....	Thesis committee .....	Before admission to final oral examination.
Final written examination in major .....	Major department members of the graduate faculty	Four weeks before commencement and before final oral examination.
Final oral examination ..	Adviser, majority of members of major department, and other members appointed by dean of Graduate School .....	Not later than two weeks before commencement.
Bond for publication of thesis .....	Registrar .....	Not later than one week before commencement.

## DESCRIPTION OF COURSES

The various divisions are grouped under the following departments:

1. Anatomy (including histology and embryology).
2. Biophysics.
3. Physiology and Physiologic Chemistry.
4. Pharmacology and Therapeutics.
5. Pathology.
6. Bacteriology and Immunology.
7. Medicine (including general medicine, dermatology, and nervous and mental diseases.
8. Pediatrics.
9. Surgery (including general surgery, orthopedic surgery, urology, proctology, and dental surgery).
10. Obstetrics and Gynecology.
11. Ophthalmology and Oto-Laryngology.
12. Radiology.
13. Preventive Medicine and Public Health.

In each department the work is described in two separate groups: A—that given in the Medical School, and B—that given in the Mayo Foundation. All courses are numbered for purposes of registration. The courses given in the Mayo Foundation are given the special prefix M. The suffixed f, w, s, and su indicate fall, winter, spring, and summer quarters, respectively. The hyphen denotes courses continuous through the quarters indicated. Suffixed letters separated by commas indicate the repetition of the course in the corresponding quarters. The courses numbered between 100 and 200 are less advanced in character, and in some cases are open as electives to properly qualified undergraduates. The courses above 200 are primarily graduate in character, of the more advanced or research type.

### ANATOMY

#### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professor Clarence M. Jackson, M.S., M.D., LL.D., Thomas G. Lee, B.S., M.D., Andrew T. Rasmussen, Ph.D., Richard E. Scammon, Ph.D.

The Institute of Anatomy offers excellent facilities to students who wish to take advanced work or to pursue investigations in anatomy.

The prerequisite work for all students who desire a major or minor in the Department of Anatomy includes general zoology, 6 semester hours, and advanced zoology or elementary courses in anatomy (including histology, embryology, and neurology), 6 semester hours. In addition, each student who desires a major in anatomy must have had the elementary courses in that branch of anatomy in which he desires to specialize—gross anatomy, histology, embryology, or neurology. Students majoring in clinical subjects who desire a minor in anatomy must have had the courses in anatomy usually required of medical students (including Courses 103, 107,

and III). A reading knowledge of either French or German is required of students who desire a major in anatomy for the Master's degree, and a reading knowledge of both French and German is required of those who are candidates for the Doctor's degree.

*Courses for Undergraduate and Graduate Students*

- 103s,su. Human Histology. A microscopic study of the various tissues and organs. Prerequisite: Anatomy 5-6, or equivalent. 9 credits. Dr. Rasmussen.
- 107s,su. Human Embryology. The development of the human body. Prerequisite: Anatomy 5-6, or equivalent. 6 credits. Dr. Scammon.
- 111s,su. Human Neurology. A study of the gross and microscopic structure of the central nervous system and sense organs of man. Prerequisites: Anatomy 103 and 107, or Zoology 26w. 6 credits. Dr. Rasmussen.
- 115w. History of Anatomy. Prerequisite: Anatomy 5-6. 1 credit. Dr. Miller.
- 121f,s. Anatomical Technique. Lectures and laboratory work upon the principles and practice of microtechnique. Prerequisite: Anatomy 103, or Zoology 26w. 3 credits. Dr. Lee.
- 129f-130w-131s. Topographic Anatomy. Based upon a study of cross sections of the human body. Lectures and laboratory work. Prerequisite: Anatomy 5-6-7. 2 credits (or more) each quarter. Dr. Jackson.
- 133f,su. Anatomy of the Fetus and Child. A survey of prenatal and post-natal development. Fourth, fifth, or sixth year medical, or graduate students. Limited to sixteen students. Prerequisites: Anatomy 5-6-7, 107. 3 credits. Dr. Scammon.
- 134w. Anatomy of the New-Born. A detailed laboratory study of the anatomy of the new-born. Fourth, fifth, or sixth year medical, or graduate students. Prerequisite: Anatomy 133, or equivalent. 3 credits. Dr. Scammon.
- 135f,su. Physical Development of Childhood. Lectures, with study of illustrative material. Primarily for students in the College of Education; open to medical or graduate students by permission of instructor. 2 credits. Dr. Scammon.
- 137f-138w-139s-140su. Implantation and Placentation. A study of the implantation of the ovum, the formation of the placenta, and the earliest stages of development in man and mammals. Prerequisite: Anatomy 102 or equivalent. 3 credits (or less). Dr. Lee.
- 149w. Experimental Neurology. A study of the morphology of the central nervous system by experimental methods. Prerequisite: Anatomy 111. 3 credits (or more). Dr. Rasmussen.
- 150w. Seminar in Neurology. Largely conferences upon assigned reading. Prerequisite: Anatomy 111. Hours and credits to be arranged. Dr. Rasmussen.
- 152s. Morphology and Significance of the Endocrine System. Prerequisites: Anatomy 103 and 107. Hours and credits to be arranged. Dr. Rasmussen.

- 153f-154w-155s-156su. Advanced Anatomy. Individual topics for advanced work in gross anatomy, histology, embryology, or neurology will be assigned to students who have completed the elementary courses in the corresponding subjects. Special courses are arranged for clinical graduate students. Dr. Jackson, Dr. Lee, Dr. Rasmussen, Dr. Scammon.
- 157s. Developmental Anatomy of the Head. Prerequisite: Anatomy 107. 3 credits. Dr. Scammon.
- 158s. Special Histology and Neurology of the Head Region. Prerequisites: Anatomy 103 and 111. 3 credits. Dr. Rasmussen.
- 160f-162w-163su. Seminar in Growth of Children. A study with graphic analysis of data on physical development of children of school age. Prerequisite: Course 135, or equivalent. Hours and credits to be arranged. Dr. Scammon.

*Courses Primarily for Graduate Students*

- 201f-202w-203s-204su. Research in Anatomy. Qualified students may undertake the investigation of problems in anatomy, including histology, embryology, and neurology. Special facilities are offered to graduate students in the clinical departments for work upon problems in applied anatomy. Dr. Jackson, Dr. Lee, Dr. Rasmussen, Dr. Scammon.
- 205f-206w-207s. Anatomical Seminar. Reviews of the current literature and discussion of research work being carried on in the department. Reading knowledge of French and German required. Dr. Jackson.

**B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)**

As yet no facilities are provided for advanced work in anatomy in the Mayo Foundation. Mayo Foundation fellows desiring to take such work for one or more quarters may avail themselves of the opportunities at the Medical School.

Limited facilities for dissection are provided in the Mayo Foundation for fellows who desire a general review of anatomy.

**BIOPHYSICS**

**WORK IN THE MEDICAL SCHOOL**

Biophysics is a rather new field in medicine. It undoubtedly will develop rapidly in much the same way as biochemistry. The courses which are now offered in this field have been listed under Radiology as these courses are indispensable for those who wish to specialize in this branch of medicine. Other courses in biophysics will probably soon be offered in the Medical School, but they cannot be outlined until the laboratory has been equipped. Graduates who desire to specialize in biophysics may begin with the courses registered under Radiology and will soon have the opportunity to work with some research problem in the new laboratory which now is under construction in the Cancer Institute.

## COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professor Charles Sheard, Ph.D.; Assistant Professors Edward J. Baldes, Ph.D.; John M. Ort, Ph.D.

The usual courses in Physiologic Optics and the Physics of Sound are listed under the Courses of Instruction in Ophthalmology and Oto-Laryngology and Rhinology.

## RESEARCH

Opportunities are also offered for graduate work in biophysics in the Mayo Foundation. There are numerous problems suitable for the Master's degree. These researches are, in general, undertaken by the department in co-operation with various clinical and experimental sections of the foundation. In addition to these, advanced work looking toward the doctorate is offered in the Department of Biophysics to a limited number of well-prepared fellows.

Biophysics. Research in physical measurements on structure and functioning of cells and tissues.

M251f,w,s,su. Spectroscopic, spectrophotometric, and polariscopic measurements; effects of radiant energy; ultramicroscopic and ultraviolet microscopic studies. Dr. Sheard.

M252f,w,s,su. Colloidal physics; oxidation and reduction potentials; membrane potentials; conductivity measurements. Dr. Ort.

M253f,w,s,su. Physical properties of the blood; surface tension, interfacial and viscosity measurements; blood gas analyses. Dr. Baldes.

M254f,w,s,su. Appliances of audio frequency amplification to physiological problems. Dr. Baldes.

## PHYSIOLOGY AND PHYSIOLOGIC CHEMISTRY

## A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professors Elias P. Lyon, Ph.D., M.D., Jesse F. McClendon, Ph.D., Frederick H. Scott, Ph.D., M.B., D.Sc.; Associate Professors Chauncey J. V. Pettibone, Ph.D., Karl W. Stenstrom, Ph.D.; Assistant Professor Esther Greisheimer, Ph.D., M.D.; Instructors Joseph T. King, M.S., M.D., Milo M. Loucks, Ph.D.

The Department of Physiology is well equipped for the various types of physiologic investigation. The library facilities are good.

For a minor or major in physiology, good courses in general zoology, general chemistry, organic chemistry, and college physics, are prerequisites. Physical chemistry is desirable.

For a minor or major in physiologic chemistry, physics, general chemistry, and organic chemistry are prerequisite, and physical chemistry, quantitative chemistry, and zoology are desirable.

In addition, each student majoring in physiology or physiologic chemistry must have had the general courses, Physiology 100, 101, 103, 104, or the equivalent.

Students majoring in clinical subjects, and who desire a minor in physiology or physiologic chemistry, must have had the courses in these branches usually required of medical students.

A reading knowledge of German or French is required of candidates for the Master's degree in this department, and reading knowledge of both French and German, of candidates for the Doctor's degree.

- 100w,su-101s,su. Physiologic Chemistry. The components of the animal body; foods, digestion, the excreta, and metabolism. Prerequisite: organic chemistry. 198 hours; 12 credits. Dr. McClendon, Dr. Pettibone.
- 103su,f. Physiology of Muscle, Nerve, Blood, Circulation, Respiration, Digestion. Fourth year medical students and others. Prerequisites: organic chemistry and zoology. 132 hours; 8 credits. Dr. Scott, Dr. Lyon, Dr. Greisheimer, and others.
- 104w,su. Physiology of the Nervous System and Special Senses, Metabolism, Nutrition, and Excretion. Fourth year medical students and others. Prerequisites: Course 103 or organic chemistry and neurology. 88 hours; 7 credits. Dr. Scott, Dr. Lyon, Dr. Greisheimer, and others.
- 105f. Roentgen Rays, Light, and Radium. The physical and physiological basis of physical therapy. Fifth year medical students. 11 hours; 1 credit. Dr. Stenstrom.

#### ELECTIVE COURSES

- 108f. Seminar in Physiologic Optics. For graduate and medical students. Prerequisite: Course 104 or equivalent. 22 hours, 2 credits. Dr. Lyon.
- 109w. Seminar in Physiology of the Senses. For graduate and medical students. Prerequisite: Course 104 or equivalent. 11 hours; 1 credit. Dr. Lyon.
- 113su,f,w,s. Problems in Physiology. Arranged by instructors with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Conferences and reading. May be taken one or more quarters. Prerequisites: Courses 103, 104, or equivalent. 66 hours; 3 credits each quarter or arranged. Dr. Scott, Dr. Greisheimer or Dr. King.
- 114w-115s. Applied Physiology. The application of physiology to the interpretation of symptoms and signs of abnormal function. Prerequisites: Courses 103, 104, or equivalent. 3 credits each quarter. Dr. Greisheimer.
- 131w. Advanced Physiology of Muscle, Blood, Circulation, and Digestion. Alterations due to physiologic conditions. Conference and laboratory work. Prerequisite: Physiology 103. 66 hours; 3 credits. Dr. Scott.
- 135f,w,s. Conference on Physiology, with qualified students. 11 hours; 1 credit. Dr. Scott.
- 153f,w,s,su. Problems in Physiologic Chemistry. Special work arranged by instructors with qualified students. May be taken one or more quarters. Prerequisite: Course 100-101. Hours and credits arranged. Dr. McClendon or Dr. Pettibone.



- 155f,156w,157s. Pathological Chemistry. Blood chemistry of diabetes and nephritis. Basal metabolism, deficiency diseases. Prerequisite: Course 100-101. 66 hours, 3 credits each quarter. Dr. McClendon (with cooperation of Dr. Fahr).
- 163w. Metabolism. Lectures and laboratory work on special phases of metabolism. Prerequisite: Physiology 101. Lectures may be taken alone; number of students unlimited. 22 hours; 2 credits. Laboratory course limited to ten students. 33 hours; 1 credit. Dr. Pettibone.
- 201f,w,s. Seminar in Physiology and Pharmacology. For instructors and advanced students. 11 hours; 1 credit. Dr. Scott, Dr. Hirschfelder, and staff.
- 203f,w,s,su. Research in Physiology. Hours and credits arranged. Dr. Scott, Dr. Lyon, Dr. Greisheimer, Dr. King.
- 204f,w,s,su. Research in the Physics and Physiology of Radiation. Hours and credits arranged. Dr. Stenstrom.
- For electives in the practical aspects of radiology and allied subjects offered by Dr. Stenstrom, see Hospital Department.
- 205f,w,s,su. Research in Physiologic Chemistry. Hours and credits arranged. Dr. McClendon, Dr. Pettibone.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

Professor Edward C. Kendall, Ph.D.; Assistant Professors Arnold E. Osterberg, Ph.D., Edgar J. W. Witzemann, Ph.D.; Instructors Marschelle H. Power, M.D., Ph.D., Mary Whelan, M.A.

Most of the opportunities for graduate work in physiologic chemistry in the Mayo Foundation are in connection with the departments of Medicine, Pediatrics, and Clinical Pathology, for which see announcements under these several departments. In addition to these, advanced work is offered in the Department of Biochemistry to a limited number of well-prepared fellows.

- M251f,w,s,su. Physiologic Chemistry. Research work in problems related to metabolism; includes training in the use of methods of organic and inorganic analysis. Dr. Kendall, Dr. Osterberg.
- M253f,w,s,su. Medical Chemistry. Chemical and metabolic studies (in nephritis, acidosis, diseases of the liver and of the blood) together with research work along biochemical and metabolic lines. Dr. Rowntree, Dr. Keith, Miss Whelan. (See Department of Medicine.)
- M254f,w,s,su. Medical Chemistry. Chemical and metabolic studies in diabetes, together with research work along biochemical lines. Dr. Wilder, Dr. Power. (See Department of Medicine.)
- M255f,w,s,su. In connection with various medical departments, special courses in biochemistry may be taken—(a) In the metabolic laboratory at the Kahler Hospital. (b) In the clinical chemical laboratories at the clinic. (c) In the medical laboratory at St. Mary's Hospital.

## PHARMACOLOGY AND THERAPEUTICS

## A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professor Arthur D. Hirschfelder, B.S., M.D.; Associate Professor Edgar D. Brown, Phm.D., M.D.

The laboratories of the Department of Pharmacology are excellently equipped for the study of both the chemical properties of drugs and their actions upon the functions of the living organs and tissues. They are well equipped with chemical apparatus for the synthesis of new medicinal compounds, for studies upon the detection, isolation, and estimation of poisons in toxicology and for the isolation of medicinal plant constituents. By the co-operation of the clinical departments, special studies may be made of the action of drugs, old and new, upon patients in the University and allied hospitals.

Opportunities are afforded for the special study of the actions of drugs which are used in each of the clinical specialities and the literature bearing upon them. As the needs of each graduate student are individual in this regard, these studies are taken up by conference, seminar, and experiments specially devised to meet each case.

- 101w. Introduction to Pharmacology. The principles underlying the structure, physicochemical properties, physiologic, therapeutic, and toxic action of substances, natural or synthetic, used as medicines. At least one quarter of physiology is prerequisite. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Brown.
- 102s. General Pharmacology. A study of the most important drugs used in medicine with consideration of their chemical properties, actions on the normal and abnormal body, modes of administration, preparations, dosages, etc. 132 hours; 6 credits. Dr. Hirschfelder, Dr. Brown.
- 105su,w. General Pharmacology, in continuation. Lectures on narcotic, saporific, analgesic, antipyretic drugs, remedies used for the treatment of arthritides, etc. Writing of prescriptions for the drugs used. 33 hours; 3 credits. Dr. Hirschfelder, Dr. Brown.
- 106f. General Pharmacology, in continuation. Lectures on the salts of the metals, antiseptics, antisyphilitic drugs, chemotherapy, etc. 33 hours; 3 credits. Dr. Hirschfelder, Dr. Brown.
- 109f,w,s,su. Pharmacological Problems. Special investigations and experimental study of one or more of the following topics: anesthetics; circulatory stimulants and depressants; drugs acting upon the kidneys; urinary antiseptics; poisons and antidotes; effects of common harmless drugs; internal secretions; action of drugs upon parasites, tumors, etc. Hours and credits by arrangement. Dr. Hirschfelder, Dr. Brown.
- 110f,w,s. Poisons. Their detection, actions, and antidotes. 66 hours; 2 credits. Dr. Brown.
- 201f,w,s. Seminar in Physiology and Pharmacology. Reviews of recent literature. 11 hours; 1 credit. Staff.

- 203su,f,w,s. Research in Pharmacology. Open to graduate and advanced students. Hours and credits arranged. Dr. Hirschfelder, Dr. Brown.
- 204f,w,s. Advanced Pharmacology. With collateral readings. Limited to six advanced students. 11 hours; 1 credit. Time to be arranged. Dr. Hirschfelder, Dr. Brown.
- 205f,w,s. Chemical Pharmacology. Collateral reading and discussion of the relation of chemical structure to pharmacological action. Limited to four graduate students. 11 hours; 1 credit. Hour and registration to be arranged. Dr. Hirschfelder, Dr. Brown.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

All opportunities for advanced work in pharmacology and therapeutics offered in the Mayo Foundation are in connection with the departments of Medicine, Pediatrics, and Surgery. See announcements of these departments.

### PATHOLOGY

#### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professors Elexious T. Bell, B.S., M.D.; Benjamin J. Clawson, M.D., Ph.D.; Assistant Professors James Shearer McCartney, Jr., B.A., M.D., John Franklin Noble, M.D., Margaret Warwick, B.S., M.D.

Graduate students who desire to take their major or minor work in pathology must present credit in the following subjects: physics, 8 credits; general and organic chemistry, 12 credits; zoology, 6 credits; and a reading knowledge of German.

In addition, students who elect their major work in pathology must present credits for the equivalent of the first two years' work of the Medical School of this University.

- 104f,w,s,su. Autopsies. The average number of post-mortems available is about 110 per month or about 1320 per year. Graduate students take part in post-mortems, prepare post-mortem records, and make microscopic examination of various organs and tissues. The student may attend as many post-mortems as his other work allows.
- 106f,w,s,su. Pathologic Technique. In this course the students may learn to prepare frozen sections from fresh tissues or tissues fixed in formalin. Instruction is also given in methods of preparing paraffin sections. There is also opportunity to learn some special staining methods. Hours to be arranged.
- 107f,w,s,su. Advanced Pathology. Each student is assigned a problem on which surgical or post-mortem material is available. Hours to be arranged.
- 108f,w,s,su. Diagnosis of Tumors. In this course one two-hour period per week is devoted to the study of clinical cases which are discussed by the pathologist and the surgeon. Subsequent operative findings and the results of treatment are also reported. From four to eight clinical cases are demonstrated each period. One three-hour period per week

- is devoted to systematic laboratory work in the study of gross and microscopic preparations of tumors. Five hours per week. Laboratory work in fall and winter quarters only. Dr. Bell, Dr. McCartney, Dr. Campbell.
- 109f,w,s,su. Clinical Pathologic Conference. The students are provided one week in advance with the clinical history of a case. The case is fully discussed clinically. The students are expected, in so far as possible, to predict the post-mortem findings from the clinical data. A full post-mortem report is then given. One hour per week. Dr. Bell.
- 111s. Neuropathology. This course comprises a thoro study of the various lesions of the nervous system. One or two hours a week are devoted to lectures and recitations. The rest of the time is spent in the laboratory and lesions are studied both grossly and microscopically in connection with the clinical phenomena presented by the patients. Special emphasis is given to abnormal physiology. Six hours per week. Dr. J. C. McKinley.
- 112w. Pathology of Diseases of the Eye, Ear, Nose, and Throat. This course consists of lectures, demonstrations, and laboratory work on diseases of these special organs. A fair number of museum preparations is available. Three hours per week. Dr. W. E. Camp.
- 113f,w,s,su. Voluntary Assistantship in Pathology. Medical students during the internship period may receive credit for full time work in pathology. Such students devote their time to the study of post-mortem and operative material. They are required to attend as many post-mortems as possible. They may also act as voluntary teaching assistants if they wish.
- 115s. Histopathology of the Skin. This course consists of lectures and microscopic studies of the various skin diseases. Some gross specimens are available and representative clinical cases are frequently brought over from the university dispensary. Dr. H. E. Michelson.
- 201f,w,s,su. Research. Graduate students, of the necessary preliminary training, may elect research, either as majors or minors in pathology. Hours and credits to be arranged.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

Professors Louis B. Wilson, M.D., William C. MacCarty, M.S., M.D., Frank C. Mann, M.A., M.D., Ralph G. Mills, B.A., M.D., Harold E. Robertson, B.A., M.D., D.Sc., Arthur H. Sanford, M.A., M.D., Associate Professors Albert C. Broders, M.D., M.S. in Pathology, Thomas Byrd Magath, M.S., M.D., Ph.D.; Assistant Professor Jesse L. Bollman, B.A., M.S., M.D.; Instructors Harold D. Caylor, M.D., M.S. in Pathology, James W. Kernohan, M.B., M.A.

Opportunities for advanced work in pathology are offered in five different sections in the Mayo Foundation, as follows:

##### 1. Clinical Pathology. Dr. Sanford, Dr. Magath.

Work in this section includes diagnostic work in the laboratories of gastrology, urinalysis, serology, bacteriology, parasitology, and clinical

chemistry. The total number of examinations in these laboratories in one year is considerably more than 250,000. Of this number about 35,000 are Wasserman tests. Graduate students in these clinical laboratories may learn the technique of accepted diagnostic procedure. Special attention is called to the opportunity for experience and research in serology under the direction of Dr. Sanford, and for training and research in parasitology under the direction of Dr. Magath. This work may be taken either as a major, or fulfilling the conditions of a minor.

For opportunities in bacteriology offered in the clinical laboratories see announcements of this department.

2. Pathologic Anatomy. Dr. Robertson, Dr. Mills, Dr. Kernohan.

Post-mortem examinations are made in sufficient numbers to provide active work for approximately ten fellows at a time.

The service is designed to permit the laying of a thoro foundation in the general principles of pathologic anatomy. Each fellow serves as junior assistant three months and senior assistant three months, during which time he takes part in the routine of post-mortem examinations and studies the microscopic sections of these post-mortems, and engages in weekly conferences and seminars concerned with general and special subjects in pathologic anatomy. Each fellow is expected to take up some special line of work upon which he reports to the group. Microscopic and gross demonstrations are held at frequent intervals and the work throughout is intimately supervised. Collateral reading and study are encouraged and oftentimes the foundation may be laid for thesis subjects or special lines of research. In connection with this work there is a well-organized museum for both display and study purposes. Fellows are aided and encouraged in the use of this museum to further their knowledge.

3. Surgical Pathology. Dr. MacCarty, Dr. Broders, Dr. Caylor.

The laboratories of surgical pathology in St Mary's, Colonial, Kahler, and Worrell hospitals receive immediately all tissue removed at operation. It is studied both grossly and microscopically. The minimum service in this work is six months, during which time opportunity is given to study a large amount of operative material. Besides the routine diagnostic work fellows are expected to begin to carry along in these laboratories some piece of pathologic research.

4. General Pathology. Dr. Wilson.

The work in this section consists entirely of individual research work. The minimum service in this section is six months.

5. Experimental Pathology. Dr. Mann, Dr. Bollman.

Work in this section consists of research in problems of pathology involving the use of experimental animals.

M151f,w,s,su. Parasitology. Routine clinical and special research in parasitology, examination of stools, study of internal parasites. Dr. Magath.

- M152f,w,s,su. Clinical Pathology. Making and examination of cultures, preparation and administration of autogenous vaccines, Wasserman tests, special clinical and laboratory methods including hematology and serology and opportunity for research. Dr. Sanford.
- M153f,w,s,su. Laboratory Demonstration of clinical laboratory methods. Dr. Sanford, Dr. Magath.
- M154f,w,s,su. Clinical Chemistry. Studies in the newer methods of blood chemistry. Dr. Sanford, Dr. Magath.
- M155f-w,w-s,s-su,su-f. Necropsy Service. Junior assistant three months; senior assistant three months; demonstrations in clinico-pathologic conferences; microscopic examination of fixed tissues removed at necropsy and operations. Weekly seminar. Dr. Robertson, Dr. Mills, Dr. Kernohan.
- M156f,w,s,su. Laboratory Demonstration of tissue removed at necropsy and operation. Dr. Robertson, Dr. Mills, Dr. Kernohan.
- M157f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. The diagnosis of surgical specimens (gross and microscopic) with immediate correlation with all clinical data. (Daily demonstrations and discussions.) Dr. MacCarty, Dr. Broders, Dr. Caylor.
- M158f,w,s,su. Studies of Tumor Cells with Vital Stains. Dr. MacCarty, Dr. Broders.
- M251f,w,s,su. Research Studies in Special Pathology; special pathology of various organs; gross and microscopic study of lesions; research work on assigned problems in the several fields. Dr. Wilson.
- M252f,w,s,su. Cancer Research. Cytologic, histogenetic, and statistical. Dr. MacCarty, Dr. Broders.
- M253f,w,s,su. Research Studies upon clinico-pathologic standardization. Dr. MacCarty, Dr. Broders.
- M254f,w,s,su. Research Work on assigned problems in experimental pathology. Dr. Mann.
- M255f,w,s,su. Research Work in clinical pathology. Dr. Sanford, Dr. Magath.

## BACTERIOLOGY AND IMMUNOLOGY

### A. COURSES OFFERED AT THE MEDICAL SCHOOL

- Professors Winford P. Larson, M.D., Arthur T. Henrici, M.D.; Associate Professor Robert G. Green, M.A., M.D., Assistant Professor H. Orin Halvorson, M.S., Ph.D.
- 101f,su. Special Bacteriology for Medical Students. The study of pathogenic bacteria, especially in relation to definite diseases; bacteriological methods in clinical diagnosis; principles of infection and immunity, with practical application of serum reactions. Fourth year medical students and others. Prerequisite: general bacteriology. 66 hours; 4 credits. Dr. Larson and assistants.
- 105f. Food Bacteriology. The decay, fermentation, and putrefaction of foodstuffs; molds; canning; bacterial food poisoning; bacteriology of

- the cleansing processes. Prerequisite: general bacteriology. 44 hours; 3 credits.
- 114s. Molds, Yeasts, and Actinomycetes. Study of morphology, cultivation, and classification of actinomycetes, yeasts, and molds. Study of the mycoses. Prerequisite: general bacteriology. 44 hours; 3 credits. Dr. Henrici.
- 116w. Course in Immunity. Laws of hemolysis. Quantitative relationships between antigen and antibody. Wasserman reaction. Opsonins. Vaccines. Precipitin reaction. Blood grouping. Abderhalden reaction. Anaphylaxis. Fifth and sixth year medical students. Limited to ten students. 66 hours; 3 credits. Dr. Larson.
- 117s. Pathogenic Protozoa. Study of parasitic Protozoa in men, including spirochaets; their morphology and life history; intermediate hosts as agents in the spread of disease; cultural methods. Prerequisites: general and special bacteriology; Zoology 144. 66 hours; 3 credits. Dr. Larson.
- 118f. Morphology and Taxonomy of Bacteria. Cytology of bacteria; their origin and systematic position; consideration of morphological, biochemical, and immunological characters as data for classification; variations and mutations in bacteria; the biometrical method as applied to bacteriology. Prerequisites: general and special bacteriology. 44 hours; 3 credits. Dr. Henrici.
- 119f. Bacteriological Chemistry. Microphysics of bacteria. Inorganic and organic constituents. Permeability of cells. Metabolism of bacteria. Enzymes of micro-organisms. Bacterial activity in the gastrointestinal tract. Pigments. Prerequisites: general and special bacteriology; physiologic chemistry or phytochemistry. 66 hours; 4 credits. Dr. Green and assistant.
- 120w. Continuation of 119f. Bacteriolysants. Protein poisons. Bacterial toxins. Phagocytosis, application of quantitative laws to disinfection, hemolysis and immune reactions. Cataphoresis. Stability of bacterial suspensions. Protein chemistry of immune reactions. Dr. Green.
- 125w. Industrial Bacteriology. Bacteriology of foods, fermentations, enzyme production, commercial sterilization. Bacteria in chemical industries, manufacture of acetone, butyl, alcohol, acetic, lactic, and sulphuric acids, leather and sugar industries.
- 150f-151w (or 150w-151s). Advanced Bacteriology. An advanced course giving additional work in bacteriology and the opportunity of working out special problems. Limited to ten students. 44 hours; 3 credits. Dr. Larson, Dr. Henrici.
201. Research in Bacteriology. Graduate students of the necessary preliminary training may elect research, either as majors or minors, in bacteriology. Hours and credits arranged. Dr. Larson, Dr. Henrici.
203. Seminar in Bacteriology. One credit.
- 205s. Bacteriological Survey. A survey of original literature in bacteriology and related sciences. 3 credits. Dr. Larson, Dr. Henrici, Dr. Green.

## B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professors Edward C. Rosenow, M.D., Arthur H. Sanford, M.A., M.D.; Associate Professor Thomas Byrd Magath, M.S., M.D., Ph.D.; Instructors Allen A. C. Nickel, B.S., M.D.

Opportunities for the graduate study of bacteriology and immunology are in connection with routine clinical examinations and in special research. They are open to (a) graduate students holding only their baccalaureate or Master's degree who have already had at least 176 clock hours of bacteriology but who have not had adequate preparation in pathology. Such students will not be permitted to attempt work involving a knowledge of pathology; (b) graduates in medicine or holders of Master's degrees who have had work both in bacteriology and pathology equivalent to that given in the medical course in the University. Such students will be given opportunity to do work in bacteriology involving pathologic relationships.

- M151f,w,s,su. Clinical Bacteriology and Parasitology. Making and examination of cultures. Preparation and administration of autogenous vaccines. Wasserman tests; special laboratory methods in clinical bacteriology or parasitology. Dr. Sanford, Dr. Magath, Dr. Thompson.
- M152f,w,s,su. Bacteriology of Necropsy Material. Collection of bacteriological material at necropsy under the supervision of a pathologist and its study in the laboratory under the supervision of a bacteriologist. Dr. Sanford, Dr. Magath, Dr. Robertson.<sup>1</sup>
- M153f,w,s,su. Bacteriology of Surgical Material. Collection of bacteriological material from operative specimens under the supervision of a pathologist and its study in the laboratory under the supervision of a bacteriologist. Dr. Sanford, Dr. Magath, Dr. MacCarty,<sup>1</sup> Dr. Broders.<sup>1</sup>
- M154f,w,s,su. Special Bacteriology of Medical Cases. A collection of bacteriological material in medical cases under the supervision of a physician and its study in the laboratory under the supervision of a bacteriologist. Dr. Sanford, Dr. Magath, Dr. Rowntree,<sup>2</sup> Dr. Keith.<sup>2</sup>
- M251f,w,s,su. Experimental Bacteriology. Research in the bacteriology of normal and diseased tissues, the blood, secretions and exudates. Experimental inoculation of animals and immunological studies. So far as possible work limited to study of pathogenesis and to development of specific methods of prevention and treatment of various diseases presumably of infective origin. Dr. Rosenow, Dr. Nickel.

## MEDICINE

(Including General Medicine, Dermatology, and Nervous and Mental Diseases)

The graduate work in the Department of Medicine is designed to offer opportunities for gifted men and women thoroly to prepare themselves for the practice of internal medicine or any of its subdivisions as a specialty. It also aims to guide its fellows in research in these fields and to give them

<sup>1</sup> See Department of Pathology.

<sup>2</sup> See Department of Medicine.



a start in university teaching. Prospective fellows who have had no special work in addition to that of the ordinary undergraduate courses will profit greatly from some special work in medicine. While work in any of the fundamental subjects might be of value, physiology, biochemistry, bacteriology, and pathology at the present are of the greatest importance. Work in any of these subjects might be further continued during the work in medicine to meet the requirements for a minor subject. Such work may also be done in pharmacology. For fellows specializing in nervous and mental diseases work in anatomy or psychology might be of special value as a minor. Work can also be arranged in the Department of Ophthalmology and Oto-Laryngology for fellows working in nervous and mental diseases, thus giving special opportunity to study lesions of the eye occurring in systemic disorders.

#### GENERAL MEDICINE

##### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professors Hilding Berglund, M.D. (Head);<sup>1</sup> S. Marx White, B.S., M.D., F.A.C.P., George E. Fahr, B.S., M.D., Henry L. Ulrich, B.S., M.D., F.A.C.S., Henry E. Michelson, B.Sc., M.D.; Associate Professors Moses Barron, B.S., M.D., J. Arthur Myers, Ph.D., M.D., Ernest T. F. Richards, M.D., C.M., John P. Schneider, M.D.

For graduate work in internal medicine the University Hospital (officially, The Minnesota General Hospital) and the Minneapolis General Hospital afford a wide range of clinical material both in the wards and in the out-patient departments. For research work there are opportunities at the University Hospital in its laboratories for biochemistry, cardiography, basal metabolism, and experimental medicine. Similar opportunities may be made available at the Minneapolis General Hospital.

Anatomy, physiology, biochemistry, pathology, bacteriology, immunology, and pharmacology have their laboratories and teaching centers on the campus and the pursuit of a minor subject to the extent required by the Graduate School may be carried on alongside of, and in intimate relation to, the more definitely clinical studies. The large autopsy service of the Department of Pathology gives experience in this field and provides control of clinical diagnosis.

The more intensive clinical studies of the fellow are carried on in one or both of the hospitals mentioned and the out-patient departments are utilized to the degree necessary for training of the fellow in the type of work to be met with later in practice.

During a longer or shorter period of his fellowship the fellow will act as assistant resident physician or as resident physician in one of the hospitals. In this position he has to assume greater responsibilities in the care of the patients than during the internship.

It is required that a certain amount of time be given by the fellow to teaching.

Besides the clinical work a fellowship also includes research work toward the fulfillment of the requirements for an acceptable thesis. This

<sup>1</sup> Absent on leave, 1928-29.

work may be purely clinical, but more preferably, a combined clinical and laboratory study. The character of the thesis work will vary considerably with the intellectual capacity of the fellow, but as a general principle it can be stated that the thesis work aims to lead the fellow into the field of research.

The courses listed below are described in the broadest outlines and for purposes of recording the character of the work done. No hard and fast program is contemplated, the individual capabilities, needs, and purposes of the fellow being given particular attention.

- 201f,w,s,su. Clinical Medicine. Study of general diagnosis and methods of investigation and of the recording of clinical data. Emphasis placed on methods of treatment. Dr. Berglund, Dr. Fahr, Dr. Ulrich, Dr. Barron, Dr. Richards, Dr. Schneider.
- 202f,w,s,su. Diseases of Cardiovascular Apparatus. Special study of diseases of the heart and blood vessels, including technique and application of the polygraphs, electrocardiograph, and interpretation of outlines of the heart and great vessels obtained by means of radiograms and orthodiagram. Dr. Fahr, Minneapolis General Hospital and University Dispensary.
- 203f,w,s,su. Research in Medicine. University Hospital. Dr. Berglund, Dr. White, Dr. Ulrich.
- 204f,w,s,su. Problems in Medicine. Specific problems in diagnosis and treatment, including problems in immunology viewed from the clinical standpoint. General Hospital. Dr. Fahr, Dr. Barron.
- 205f,w,s,su. Tuberculosis. Opportunities in the study of problems relating to tuberculosis are offered. Co-operation between the Medical School and tuberculosis sanatoria is close, and problems may be studied, both the clinical and laboratory sides. An out-patient department is also available. Dr. Myers.
- 206f,w,s,su. Research in Mouth Infections. A study of dental and parodontal infections as related to systemic diseases. Experimental study to determine the lesion produced in animals by bacteria from these sources. Dr. Hartzell.
- 209f,w,s,su. Neurologic Research. Dr. Hamilton, Dr. McKinley.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professors Leonard G. Rowntree, M.D., D.Sc. (Chief); Henry S. Plummer, M.D., Arthur H. Sanford, M.A., M.D., Russell M. Wilder, B.S., M.D., Ph.D.; Associate Professors Walter C. Alvarez, M.D., Walter M. Boothby, M.A., M.D., George E. Brown, M.D., George B. Eusterman, M.D., Herbert Z. Giffin, B.S., M.D., Norman M. Keith, B.A., M.D., Willis S. Lemon, M.B., Archibald H. Logan, M.D., Frederick A. Willius, M.D., M.S. in Med.; Assistant Professors David M. Berkman, M.D., M.S. in Med., Harry M. Conner, M.D., Fred W. Gaarde, B.S., M.D., Carl H. Greene, B.A., M.D., Ph.D., Dorr F. Hallenbeck, M.D., Howard R. Hartman, B.S., M.D., Charles S. McVicar, M.D., Herman J. Moersch, M.D., M.S. in Med., Monte

C. Piper, M.D., William A. Plummer, M.D., Lee W. Pollock, B.S., M.D., Leda J. Stacy, M.D., Porter P. Vinson, B.S., B.A., M.D.; Instructors S. Franklin Adams, M.D., M.S. in Med., Frank N. Allan, M.B., B.S., Edwin G. Bannick, B.S., M.D., Clifford J. Barborka, B.S., M.D., J. Arnold Bargaen, B.S., M.D., Arlie R. Barnes, M.A., M.D., Maurice B. Bonta, B.A., B.S., M.D., Alex E. Brown, B.S., M.D., Philip Walling Brown, B.A., M.D., M.S. in Med., James L. Busby, M.D., Mandred W. Comfort, B.A., M.D., M.S. in Neurol., Austin C. Davis, B.A., M.D., Della G. Drips, M.D., M.S. in Path., Harold F. Dunlap, B.S., M.D., William P. Finney, B.A., M.D., Harold C. Habein, B.A., M.D., Samuel F. Haines, B.S., M.D., Philip S. Hench, B.A., M.D., Lester D. Huffman, B.S., M.D., M.S. in Med., Duncan M. Masson, M.B., Charles K. Maytum, M.D., Laura Mary Moench, B.A., M.D., M.S. in Med., Susan R. Offutt, B.A., M.D., Louis E. Prickman, B.S., M.D., M.S. in Med., Andrew B. Rivers, M.D., Irene Sandiford, Ph.D., Albert M. Snell, B.S., M.D., M.S. in Med., James F. Weir, B.A., M.D., M.S. in Med., Harry G. Wood, M.D., C.M.

The clinical work in internal medicine in Rochester consists of diagnostic work on the floor of the clinic or in one of the hospital medical services, and includes history taking, physical examinations, the recommendation of patients for special examinations with correlation of the results thereof, and the formation of independent judgments concerning diagnoses and indications and recommendations for medical and surgical treatment, all under the immediate direction of the head of the section and his associate or first assistant.

Each service consists of six days each week for one calendar year, except as noted, in a clinical section. There are thirteen general diagnostic sections in which the fellow may work in the clinic and eight medical hospital services. The satisfactory completion of at least two services of one year each in these sections is required for recommendation for an advanced degree. When he is sufficiently competent in clinical work the fellow may be appointed to a first assistantship for a period of one year. This provides him with opportunities for informal teaching of junior men and with an additional stipend of \$1,000 a year, from the Mayo Clinic.

The Medical Department has recently been extended and has been furnished amply with medical beds—in the neighborhood of four to five hundred—in St. Mary's, Kahler, and Colonial hospitals. Laboratories have been established in St. Mary's and Kahler hospitals and equipped with ample facilities for the best type of routine medical practice and for medical research and investigation. Special services have been created for the intensive study of metabolic, cardiorenal vascular diseases, and diseases of the glands of internal secretion.

Most medical graduates are usually lacking in autopsy experience. Efficiency in this most essential field can be made up by a service of six months or more in the Section of Pathologic Anatomy. Such a service gives the fellow good experience in autopsy technic and diagnosis.

In graduate work in medicine the didactic lecture plays but a minor rôle. In the diagnostic clinic and hospitals much of the teaching is done through seminars, through ward rounds, and by contact between the professor and the fellow in the handling of the patients, or in the carrying out of laboratory procedures. In both clinical and hospital sections the fellow enters the section as an assistant and assists in the actual work of these sections under the supervision of the head of the section and his associates.

Seminars are conducted in each section. In the clinical seminars cases of unusual interest are discussed and presented. In the hospital services additional seminars are conducted on special phases of medicine, on laboratory methods, on current medical literature, and pathologic conferences are conducted in cases coming to operation and necropsy. In these seminars the fellows themselves play an active rôle in presenting to the group cases or subjects which have been assigned to them by their chiefs.

In the laboratories fellows are given every opportunity to work out for themselves the problems of their choice or to participate in investigations being carried out by members of the staff.

Staff meetings are held weekly on Wednesday evenings and problems and cases of interest are presented and discussed. Foundation lectures are given five evenings a week by members of the staff or by invited lecturers.

As soon as he becomes oriented, each fellow is expected to find time, in addition to his clinical work, to begin and carry forward persistently some piece of research. While this may be purely clinical, in most instances it will be found to have relationships requiring detailed study in physiology, physiologic chemistry, pathology, or bacteriology.

Research work in special laboratory departments is done under the head of the department with the advice and counsel of the head of the clinical department in which the fellow is registered.

The usual fellow will find that approximately two thirds of his time should be devoted to diagnosis and treatment of disease, but provision is also made for the occasional fellow with unusual research ability who desires to devote his entire time, or the major part of it, to scientific investigation.

Tho the minimum time required for recommendation for the degree of master of science for work done in these fields is three years, it will usually be found that considerably more time is desirable and supplementary stipends are provided for men desiring to devote four or five years to the work.

M151f,w,s,su. Laboratory of Hematology and Urinalysis. Dr. Sanford.

M152f,w,s,su. Gastrological Laboratory. Dr. Sanford.

M153f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to diseases of the gastrointestinal and accessory digestive tracts. Dr. Alvarez, Dr. Eusterman, Dr. Hartman, Dr. McVicar, Dr. Rivers, Dr. Weir.

- M154f,w,s,su. Clinical Demonstration of diseases of the gastrointestinal and accessory digestive tracts. 24 hours. Dr. Eusterman, Dr. Hartman, Dr. McVicar, Dr. Rivers, Dr. Weir.
- M155f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special references to diseases of the intestines. Dr. Logan, Dr. Bargaen, Dr. P. W. Brown, Dr. Comfort.
- M156f,w,s,su. Clinical Demonstration of diseases of the intestines. 24 hours. Dr. Logan, Dr. Pollock.
- M158f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to diseases of the chest and esophagus. Dr. Lemon, Dr. H. J. Moersch, Dr. Vinson, Dr. Wood.
- M159f,w,s,su. Clinical Demonstration of diseases of the chest and esophagus. 48 hours. Dr. Lemon, Dr. H. J. Moersch, Dr. Vinson.
- M160f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to diseases of the blood and blood-forming organs. Dr. Giffin, Dr. Conner, Dr. Bonta.
- M161f,w,s,su. Clinical Demonstration of diseases of the blood and blood-forming organs. 24 hours. Dr. Giffin, Dr. Conner, Dr. Bonta.
- M162f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to diseases of the cardiovascular system and ductless glands. Dr. H. S. Plummer, Dr. Boothby, Dr. Willius, Dr. W. A. Plummer, Dr. Barnes, Dr. Davis, Dr. Dunlap, Dr. Haines.
- M163f,w,s,su. Clinical Demonstration of diseases of the thyroid. 24 hours. Dr. H. S. Plummer, Dr. Boothby, Dr. Willius, Dr. W. A. Plummer, Dr. Barnes, Dr. Davis, Dr. Dunlap, Dr. Haines.
- M164f,w,s,su. Clinical Demonstration of diseases of the cardiovascular system. 24 hours. Dr. H. S. Plummer, Dr. Willius.
- M165f-w,w-s,s-su,su-f. Diagnosis and Research (clinical and laboratory) in cardiorenal and vascular and metabolic diseases. Dr. Rowntree, Dr. Wilder, Dr. G. E. Brown, Dr. Keith, Dr. Greene, Dr. Adams, Dr. Allan, Dr. Bannick, Dr. Hench, Dr. Snell.
- M166f,w,s,su. Clinical Demonstration of cardiorenal, vascular, and metabolic diseases. 24 hours. Dr. Rowntree, Dr. G. E. Brown, Dr. Keith.
- M167f,w,s,su. Clinical Demonstration of pancreatitis and diabetes. 24 hours. Dr. Wilder.
- M168f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to gynecology. Dr. Mussey, Dr. Stacy, Dr. Drips, Dr. Moench, Dr. Offutt.
- M169f,w,s,su. General Medical and Surgical Diagnosis. Dr. Berkman, Dr. Gaarde, Dr. Pollock, Dr. Barborka, Dr. Busby, Dr. Finney, Dr. Masson, Dr. Maytum, Dr. Prickman.
- M170f,w,s,su. Radium Therapy. Dr. Bowing.
- M171f,w,s,su. Roentgen Therapy. Dr. Desjardins.
- M172f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis with special reference to acute emergency conditions. Dr. Hallenbeck, Dr. A. E. Brown, Dr. Habein, Dr. Piper.
- M173f,w,s,su. Intravenous Medication. Dr. Pemberton, Dr. Huffman.

- M251f,w,s,su. Advanced Work in Electrocardiographic Laboratory. Dr. H. S. Plummer, Dr. Willius, Dr. Barnes.
- M252f,w,s,su. Metabolic Laboratory. Respiratory exchange and allied physiologic problems. Dr. Boothby, Dr. Sandiford.
- M253f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M153. 12 hours. Dr. Alvarez, Dr. Eusterman, Dr. Hartman, Dr. McVicar.
- M254f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M155. 24 hours. Dr. Logan.
- M255f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M158. 60 hours. Dr. Lemon, Dr. Gaarde, Dr. H. J. Moersch, Dr. Vinson.
- M256f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M160. 12 hours. Dr. Giffin, Dr. Bonta, Dr. Conner.
- M257f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Courses M162, M251, or M252. 12 hours. Dr. H. S. Plummer, Dr. Boothby, Dr. Willius, Dr. W. A. Plummer, Dr. Barnes, Dr. Haines.
- M258f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M165. 12 hours. Dr. Rowntree, Dr. Wilder, Dr. G. E. Brown, Dr. Keith.
- M259f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M171. 12 hours. Dr. Hallenbeck, Dr. Piper.
- M260f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M168. 12 hours. Dr. Stacy.
- M263f,w,s,su. Medical Chemistry. Chemical and metabolic studies (in nephritis, acidosis, diseases of the liver and of the blood) together with research work along biochemical and metabolic lines. Dr. Rowntree, Dr. Keith.
- M264f,w,s,su. Medical Chemistry. Chemical and metabolic studies in diabetes, together with research work along biochemical lines. Dr. Wilder.
- M265f,w,s,su. Research in Medicine. Dr. Rowntree, Dr. Wilder.

#### DERMATOLOGY

##### A. COURSES OFFERED AT THE MEDICAL SCHOOL

No advance courses in dermatology are offered in the Medical School. Graduate students desiring this work will be given opportunity in the Mayo Foundation.

##### B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professors Henry E. Michelson, B.S., M.D., Paul A. O'Leary, M.D.; Associate Professor W. H. Goeckerman, M.D.

The Department of Dermatology of the Mayo Foundation offers excellent opportunities for the study of dermatology and syphilology. The service cares for about 8,500 out-patients annually, of whom approximately 4,000 have syphilis. The patients come to the section both direct and by reference from other departments. In the majority of cases they have been

studied from every medical angle, so that the opportunity to master the relations and background of the specialty as well as its immediate diagnostic problems is unusually good. All the syphilis seen in the Mayo Clinic ultimately reaches this section, and provides a rich material for the study of every aspect of the disease. The in-patient service of the section includes a special hospital of 50 beds, with a treatment equipment in which are given from 20,000 to 25,000 treatments per year. Approximately 15,000 arsphenamine injections and 3,000 intraspinal injections are given per year, and all such patients are retained under hospital care for at least 24 hours, which permits a full study and interpretation of their reactions and response to treatment. Malaria treatments are given to approximately 250 patients per year. The section has a social worker who assists in the adjustment of the personal and social problems of patients, and directs the operation of the follow-up system. The department has special laboratories adapted to the prosecution of research problems and the general laboratories of the clinic and foundation are likewise available for this purpose.

The Department of Dermatology and Syphilology offers two types of graduate medical work.

1. *Short term service.*<sup>1</sup>—Offered only to fellows in the Mayo Foundation, with preference to those majoring in internal medicine. This course consists of three to six months of training in clinical diagnosis especially as applied to syphilology but with due emphasis on dermatology. The fellows in this group see all entering patients of the department. They are systematically drilled in methods of examination, including the objective approach, the use of the dark field, and the making of smears, stains, and special preparations of the types essential in office diagnosis. The results of special examinations in other departments of the clinic are co-ordinated and the proper use of the X-ray, the eye examination, the spinal fluid examination, the provocative procedure, and so forth in the modern diagnosis of syphilis are impressed upon the student. The fellows follow the treatment of their patients on the hospital service of the section, learning under direction, the theory of the expert management of various phases of syphilis and of cutaneous disease. Special emphasis is placed throughout the dermatologic work upon the relation of dermatology to internal medicine both from the standpoint of diagnosis and treatment. By means of conferences, quizzes, and hospital rounds, the fellow is kept alert to all aspects of the subject.

No training in technic of treatment is offered in connection with this service.

2. *Long term service.*—Fellows who take this course elect dermatology and syphilology as a major. Three years are devoted to the mastery of the specialty and to gaining the necessary ground work in related branches, including serology, radiotherapy, neurologic diagnosis, and such elective courses as may seem called for in the individual case. The purpose of major work in dermatology and syphilology is the training of experts,

<sup>1</sup> Limited to three fellows.

able to attack intelligently any problem which cutaneous and syphilologic diagnosis and treatment may present, and to assume, if necessary, organizing and teaching responsibility. The fellow in dermatology and syphilology is trained in diagnosis by at least two years of constant contact with every aspect of cutaneous disease and syphilis in both out-patient (office) service and hospital. He is trained in methods by an experience of 10,000 arsphenamine treatments of various types, 3,000 to 5,000 diagnostic spinal punctures, 2,000 to 3,000 intraspinal treatments of various types, and 250 treatments by malaria with the necessary amount of technical preparation in the simpler procedures such as intramuscular injection, etc. This is equivalent to approximately a year of treatment service. A full equipment for hydrotherapeutic work, ultra-violet light, high frequency and electrocoagulation, radium and X-ray therapy insures familiarity with the most advanced methods of dermatologic treatment.

Immediate contact with the patient while reaching a diagnosis and throughout the course of his treatment is insured by a period of hospital residence varying from six months to one year as house officer of the Dermatological Hospital, a service of 50 beds, with equipment for every refinement of dermato-syphilologic practice in a private clientele.

Training in the fundamentals of the pathology of syphilis and cutaneous disease is likewise an essential part of the equipment of the expert, and is accomplished by a laboratory and demonstration course. Special emphasis is given to histopathology of the skin.

Training in methods of investigation and research, and in the technic of preparing and publishing new material is given to the full time fellow as a necessary part of his equipment. This training begins with the statistical study of clinical problems and in the preparation of a case report. It will be extended for fellows who are suitably equipped to include an investigation, with a laboratory phase in chemistry, serology, or immunology, which the fellow exploits as his special field over his own name and uses as a basis for his thesis. A Journal Club furnishes the necessary training in the searching and interpretation of the literature.

After the second year of service fellows in dermatology and syphilology who exhibit special proficiency and fitness may be appointed assistants in the section. This provides an increase of \$1,000 per year in stipend over and above the fellowship remuneration. It makes possible the training of the fellowship man in the problems and responsibilities of consultant diagnosis, and permits his participation in teaching work. During an assistantship, the incumbent is expected to prepare and deliver a course of lectures under the supervision of the head of the department upon the history and recent developments in some important aspect of the specialty.

Discipline in executive responsibility and instruction in the problems of departmental administration are available for those who exhibit special aptitude and who are likely to be called upon to undertake organizing duties.

While full time fellowship standing in the Department of Dermatology and Syphilology is limited to those who carry the work as a major for



three years, the department is prepared to consider as applicants for one or two years of service, those who, because of previous graduate medical work in the specialty, may be regarded as already partially equipped to meet the ultimate standards of the department. No application for less than one year of service will be considered, and no "brushing up" courses for practitioners are offered.

M174f,w,s,su. General Diagnosis. With special reference to dermatology and syphilology. All day. Dr. O'Leary, Dr. Goeckerman.

M175f,w,s,su. Histopathology of the Skin. Laboratory and lectures. Dr. O'Leary.

M176f,w,s,su. Clinical Demonstration of Dermatologic and Syphilologic Material. 24 hours. Dr. O'Leary, Dr. Goeckerman.

M261f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M172. 24 hours. Dr. O'Leary, Dr. Goeckerman.

#### NERVOUS AND MENTAL DISEASES

For students specializing in nervous and mental diseases, minors in anatomy, physiology, and psychology are especially valuable, and for those desiring it work could be arranged in the Department of Ophthalmology and Oto-Laryngology, giving a special opportunity to study lesions of the eye occurring in systemic disorders.

#### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professor Arthur S. Hamilton, B.S., M.D.; Associate Professors Ernest M. Hammes, M.D., J. Charnley McKinley, M.D., Ph.D. in Neurology.<sup>1</sup>

For fellows in general medicine opportunity is given for the study of clinical neurology in the hospital and in the Out-Patient Department. For fellows specializing in nervous and mental diseases there are excellent facilities for the study of the anatomy, physiology, and pathology of the nervous system. In addition to the work in the University Hospital and Out-Patient Department the student has access to the Minneapolis General Hospital, the St. Paul City and County Hospital, and to the laboratories of the Department of Psychology of the University, as well as to the Child Guidance Clinic established in Minneapolis.

The close relation between the Division of Nervous and Mental Diseases and the Department of Eye, Ear, Nose, and Throat gives an opportunity for study under trained specialists of the special senses in their relation to diseases of the nervous system.

The clinics in general medicine are freely open to the student.

207f,w,s,su. Pathology of the Nervous System. The preparation of gross and microscopic material from diseased nervous tissues; the relations existing between pathologic lesions, signs, and symptoms; the chief neuron systems and principles underlying their degeneration. Dr. Hamilton.

<sup>1</sup> Absent on leave 1928-29.

208f,w,s,su. Clinical Neurology. Advanced diagnosis of nervous diseases; practical experience in diagnostic procedures employed in the study of diseases of the nervous system. Dr. Hamilton.

209f,w,s,su. Neurologic Research. Dr. Hamilton.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professor Walter D. Shelden, B.S., M.D.; Associate Professor Henry W. Woltmann, B.S., M.D., Ph.D. in Neurology; Instructors John B. Doyle, M.D., M.S. in Neurology, Frederick P. Moersch, B.S., M.D., Harry Lee Parker, M.B., M.S. in Neurology, Lloyd H. Ziegler, M.A., M.D.

A practical clinical course for fellows in general medicine and neurology is conducted for periods of six months or longer. This includes a daily conference on cases of special diagnostic importance, a weekly conference for the review of current neurologic literature, and a monthly clinical pathological conference for the study of autopsy material. For fellows majoring in neurology special work in neuropathology is offered. Considerable opportunity for psychiatry is offered and weekly visits are made to the Rochester State Hospital for the Insane.

This department is closely associated with the departments of the eye, ear, nose, and throat, and with various laboratories for the study of neurology as a specialty and its relationship to general medicine.

M174f-w,w-s,s-su,su-f. General Diagnosis in Neurology and Psychiatry. Dr. Shelden, Dr. Woltmann, Dr. Doyle, Dr. Moersch, Dr. Parker, Dr. Ziegler.

M175f,w,s,su. Clinical Demonstration of Neurological Diseases. 24 hours. Dr. Shelden, Dr. Woltmann, Dr. Doyle, Dr. Moersch, Dr. Parker, Dr. Ziegler.

M261f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Course M174. 12 hours. Dr. Shelden, Dr. Woltmann, Dr. Doyle, Dr. Moersch, Dr. Parker, Dr. Ziegler.

M262f,w,s,su. Neuropathology. Open to fellows who are majoring in neurology and who have had adequate preparation in general pathology. Dr. Woltmann, Dr. Kernohan.

#### PEDIATRICS

The graduate work of the Department of Pediatrics is arranged with the intention (a) of preparing students to become competent pediatricists; (b) to put them in position to attack original pediatric problems; and (c) to make them competent teachers in the subject.

#### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professors Frederic W. Schlutz, B.A., M.D., Chief; Associate Professors Edgar J. Huenekens, B.A., M.D., Walter R. Ramsey, M.D., Frederick C. Rodda, M.D.; Assistant Professors Naboth O. Pearce, M.D., Max Seham, M.D., Chester A. Stewart, M.D., Ph.D., Rood Taylor, M.D., Ph.D. in Ped.

The work of the department is conducted in the wards and Out-Patient Department of the University Hospitals, the Minneapolis General Hospital, and Lymanhurst in Minneapolis, the Ancker and Miller hospitals and the Out-Patient Department of the Wilder Charities in St. Paul. The child welfare organizations, the Child Guidance Clinic, and special arrangements with the Board of Education afford excellent opportunities of all phases of preventive pediatrics.

The general library of the University, an unusually complete departmental library, and complete files of all journals dealing with pediatrics furnish adequate reference facilities.

Research laboratories attached to the Department of Pediatrics and the large general laboratory attached to the departments of Physiology, Anatomy, Bacteriology, and Pharmacology are at the disposal of the graduate students, and afford every possible opportunity for research.

As a prerequisite a general understanding of physiologic (physical) and analytic chemistry and a working knowledge of French and German are essential.

Prospective students will find preparatory study in physiology and quantitative analysis of value.

Students will be encouraged to carry a minor in some of the fundamental branches.

The following electives in other departments are desirable. (For further information see description of courses under departmental headings.)

- Quantitative Analysis
- Organic Chemistry
- Physical Chemistry
- Mental Retardation
- Physiologic Chemistry
- Physiology of Muscle, Nerve, Blood, Circulation, and Digestion
- Physiology of the Nervous System and Special Senses: Respiration, Metabolism, Nutrition, and Excretion
- Physical Chemistry of Cells
- Electrophysiology
- Metabolism
- Quantitative Methods
- Human Neurology
- Fetal Anatomy
- General Roentgenologic Technique
- Interpretations of Roentgenologic Findings
- Hematology
- Course in Immunity
- The Physiological and Chemical Basis of Pharmacology (Pharmacology 113)
- Diseases of Cardiovascular Apparatus (Medicine 123-124)
- Medical Chemistry
- Orthopedic Service
- Orthopedic Diagnosis
- Advanced Ophthalmoscopy

- 101f,w,s. Intubation and Tracheotomy. With training upon the cadaver. Dr. Platou.
- 102f,w,s,su. Amphitheater Clinic in Pediatrics. 17 hrs. Dr. Schlutz.
- 103f,w,s,su. Clinic in Pediatrics. Conducted at the University Hospital and the Minneapolis General Hospital. Dr. Schlutz, Dr. Huerckens.
- 104f,w,s,su. Contagious Diseases. The advanced study of contagious diseases, including the practice of intubation and tracheotomy, with training upon the cadaver.
- 105f,w,s. Rare and Unusual Diseases of Infancy and Childhood. Limited to 10 students. A lecture course. 11 hrs. Dr. Stewart, Dr. Swanson.
- 111f,w,s,su. Diseases of the New-Born. Dr. Rodda.
- 115f,w,s,su. Theory and Practice of Infant Feeding. Including diseases of the gastrointestinal tract. Dr. Schlutz.
- 117f,w,s,su. Pediatric Clinic. Out-Patient Clinic; University Hospital. Dr. Schlutz and others.
120. Clinic in Child Guidance. Offered two quarters a year, usually in winter and spring. 11 hrs.
- 125f,w,s,su. Special Graduate Contagious Course. Advanced study of contagious diseases, including practice of intubation with training upon the cadaver and the living dog. Limited to graduates. Dr. Platou.
- 127f,w,s,su. Thesis Course. Dr. Schlutz and others.
- 129f,w,s,su. Pediatrics Seminar. Dr. Schlutz and staff.
- 130f,w,s,su. Course consisting of three to twelve months' residence in pediatrics and contagious diseases at Minneapolis General Hospital. Dr. Huenekens, Dr. Swanson.
- 142f,w,s,su. Preparation of Infant Foods. Practical work.
- 144f,w,s,su. Contagious Diseases. Advanced study of contagious diseases. Dr. Platou.
- 200f,w,s,su. Advanced Study of Diseases of Infants and Children. Dr. Schlutz and others.
- 202f,w,s,su. Research in Diseases of New-Born. Students undertaking this work should have had the equivalent of Fetal Anatomy and Pediatrics III. Dr. Schlutz and others.
- 204f,w,s,su. Research in Physiology of New-Born. Prerequisite: Pediatrics III. Prerequisite preparation in physiology will depend upon the type of work undertaken. Dr. Schlutz, Dr. Swanson, Dr. Ziegler.
- 206f,w,s,su. Research in Diseases of Infants and Growing Children. Prerequisite work will depend upon the type of work undertaken. Dr. Schlutz.
- 208f,w,s,su. Research in Physiology of Infants and Growing Children. Prerequisite preparation will depend upon the type of work undertaken. Dr. Schlutz, Dr. Swanson.
- 210f,w,s,su. Research in Anatomy of Infants and Growing Children. Prerequisite preparation will depend upon the type of work undertaken. Dr. Stewart, Dr. Richdori.

## B. COURSES OFFERED IN THE MAYO FOUNDATION

Professor Henry F. Helmholz, B.S., M.D.; Associate Professor Samuel Amberg, M.D.; Instructor Roger L. J. Kennedy, B.S., M.D.

The opportunities offered in pediatrics in the Mayo Foundation are designed for the purpose of training a few selected men for the special practice of pediatrics. The courses are also valuable to fellows majoring in special clinical fields.

The work of the department comprises:

a. The care of the new-born. Immediately after the birth of the infant the Pediatrics Department assumes charge.

b. The Pediatrics Department is practically in charge of the work in preventive pediatrics in the city of Rochester and in Olmsted County, co-operating with the City Health Department and the Olmsted County Public Health Association. This work comprises infant welfare work as well as the care of the child of pre-school and school age.

c. A special advantage lies in the large number of cases presenting unusual manifestations of common diseases, as well as those conditions which are not so frequently seen in the ordinary hospital and out-patient departments.

d. The work in the city affords a chance for routine practice in pediatrics, including the usual infectious diseases.

e. The department has a service of its own at St. Mary's Hospital. In addition it has the supervision of all children below the age of fourteen years in the other hospitals. The Pediatrics Department co-operates with surgical section in the pre-operative and postoperative management of the patient.

f. Research is regarded as an important feature of the graduate work, and there are ample clinical and laboratory facilities for investigative study.

M151f-w,w-s,s-su-f. Diagnosis of Medical and Surgical Diseases of Infancy and Childhood. Dr. Helmholz, Dr. Amberg, Dr. Kennedy.

M152f,w,s,su. Clinical Demonstration of Diseases of Infancy and Childhood. 24 hours. Dr. Helmholz, Dr. Amberg, Dr. Kennedy.

M153f-w,w-s,s-su,f. Preventive Pediatrics. 24 hours. Limited to two fellows. Dr. Helmholz, Dr. Amberg.

M251f,w,s,su. Seminar. Open to fellows who have been or who now are enrolled in Courses M151, M153, and M252. Dr. Helmholz, Dr. Amberg.

M252f-w,w-s,s-su,f. Research in Diseases of Infancy and Childhood. Dr. Helmholz, Dr. Amberg.

## SURGERY

(Including Divisions of Orthopedic Surgery, Urology, Proctology,  
and Dental Surgery)

## A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professor Arthur C. Strachauer, M.D., F.A.C.S., Chief; Associate Professors J. Frank Corbett, M.D., F.A.C.S., Emil S. Geist, M.D., F.A.C.S., Arthur A. Law, M.D., F.A.C.S., William Lerche, M.D., F.A.C.S., Arthur T. Mann, B.S., M.D., F.A.C.S., Harry P. Ritchie, Ph.B., M.D., F.A.C.S., John T. Rogers, M.D., F.A.C.S., Franklin R. Wright, D.D.S., M.D., F.A.C.S.; Assistant Professors Carl C. Chatterton, M.D., F.A.C.S., Wallace H. Cole, M.D., F.A.C.S., Gilbert J. Thomas, M.D., F.A.C.S., Owen H. Wangensteen, B.S., M.D., Ph.D., Arthur A. Zierold, D.D.S., M.D., Ph.D., Harry B. Zimmerman, M.D., F.A.C.S.; Instructor Frederick E. B. Foley, Ph.B., M.D.

Graduate work in surgery at the Medical School is designed to offer superior training to a limited number of fellows in three or more years of residence. The practical and scientific aspects of a well-rounded surgical course are equally emphasized.

The prospective fellow must be able to qualify as a candidate for the Ph.D. degree so far as his preliminary education is concerned. (See requirements for higher degrees.)

The fundamental laboratories of the Medical School offer numerous graduate courses closely related to surgery. (See statements of Anatomy, Pathology, Physiology, Physiologic Chemistry, and Bacteriology.) Opportunity for special investigative and research work is found in these departments. The minor subjects must be taken in one of the above departments; anatomy or pathology is usually selected by the fellow. The proximity of the medical buildings and arrangement of courses afford opportunity for co-ordination of clinical and laboratory work which is highly desirable.

The courses offered by the Department of Surgery consist of animal, experimental, and cadaver surgery, together with work in the hospital and out-patient departments in surgical diagnosis, operative surgery, and some of the surgical specialties, particularly urology and roentgenology.

Unexcelled opportunities for technical and experimental work under aseptic conditions comparable to a first-class operating room are offered in the laboratories of animal and experimental surgery. In these laboratories the fellow conducts his investigative work for his thesis.

The fellow assists in the instruction of undergraduate senior students in cadaver surgery and applied anatomy. These courses are repeated three times each year. This repetition is to the great advantage of the fellow. Clinical instruction is given throughout the entire fellowship period.

The University Hospital fellowship provides a house surgeonship in the University Hospital, with or without residence. The fellow aids the surgical staff in diagnosis and in the pre-operative and postoperative care of patients. He helps to direct and supervise the work of the internes, and after his first year assists in the bedside teaching of the surgical clerks.

He acts as first assistant in operations performed by the general surgical staff. As soon as he proves himself capable, the more simple major operations are delegated to him to perform, with the surgeon acting as first assistant. Later he is permitted to operate under the supervision of the surgeon, and finally, when he has demonstrated his ability, he operates independently. Increasingly difficult cases are assigned as his ability warrants. Supervision is always given until the staff surgeon is satisfied of the fellow's ability to perform independently any stated operation.

A Medical School surgical fellowship is also offered with assignment and residence at the Minneapolis General Hospital, which has a total of 679 beds.

By courtesy of, and arrangements with, the Mayo Foundation the second year of both of these fellowships may be spent in residence at Rochester, where exceptional opportunities for general and special diagnostic and operating room services are available.

The completion in 1925 of the Memorial Cancer Institute (a gift from the Citizen's Aid Society of Minneapolis), and the Todd Memorial Hospital, added nearly 100 beds to the facilities for clinical instruction. The Memorial Cancer Hospital has complete X-ray and radium equipment. (For special work in this field see announcements in Radiology and Biophysics.)

A six months' special training in urology is offered to all graduate students. The student acts, for a limited period, as first assistant on this service, where he is taught the various diagnostic methods including cystoscopy and the allied procedures. Assisting and independent operating in this field are also provided.

Regular graduate students who are not fellows are offered combination courses leading to qualification for advanced degrees. The University Hospital fellowships are limited to candidates for advanced degrees.

101f,w,s. Advanced Minor Surgery. The student is required to assist in the out-patient surgical clinic, and in this connection makes a special study of the diagnosis and treatment of selected cases. Staff.

102f,w,s. Operative Surgery on the Cadaver. Technique of abdominal incision and closure; of bowel suturing, appendix removal, kidney exploration, nephrotomy, tracheotomy, amputations, ligations, etc. Graduate students act as laboratory assistants, and may work out upon the cadaver various independent problems in emergency surgery. Dr. Wangenstein, Dr. Dunn.

103f,w,s. Operative Surgical Technique. A study of surgical technique by cardinal operations upon living animals. Dr. Wangenstein, Dr. Zierold.

105f,w,s. Proctoscopy and Sigmoidoscopy. The treatment and diagnosis of the pathological conditions found in the lower bowel, including minor surgical operations. Dr. Fansler.

201w,s. Surgery of the Kidney. Review of the embryology, anatomy, and pathology. Diagnosis, cystoscopic study, including kidney function estimation and pyelography; operative technic. Study of special problems involved. Dr. Strachauer, Dr. Thomas.

- 205f-206w-207s. Surgical Diagnosis. In this course the graduate student assists in the practical instruction of the clinical clerks and internes in the University Hospital, and makes a special study of problems in surgical diagnosis. Dr. Strachauer, Dr. Law, Dr. Ritchie.
- 208f-209w-210s. Surgical Service. The graduate student acts as house surgeon, and in connection with the service is required to make a special study of the patients, preparing them for clinics and observing them after operations. Dr. Strachauer, Dr. Law, Dr. Ritchie.
- 211f-212w-213s. Operative Surgery. In this course the surgical fellow acts as first assistant at all operations by the surgical staff in the University Hospital. When properly qualified, the fellow will be permitted to operate, beginning with simpler surgical procedures. Dr. Strachauer, Dr. Law, Dr. Ritchie.
- 216f,w,s. Surgical Research. Properly qualified students may undertake original investigation of problems in either experimental or clinical surgery. The work may be used for thesis purposes. Dr. Strachauer, Dr. Law, Dr. Ritchie.
- 217f,w,s. Surgical Seminar. Conference for reports on surgical literature, with presentation and discussion of specially interesting cases and research work by members of the surgical staff. Staff.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

Professors Donald C. Balfour, M.D. (Chief), E. Starr Judd, M.D., Frank C. Mann, M.A., M.D., Charles H. Mayo, M.A., LL.D., M.D., D.Sc., F.A.C.S.; Associate Professors Alfred W. Adson, M.D., M.S. in Surgery, M.A., Verne C. Hunt, B.S., M.D., M.S. in Surgery, James C. Masson, M.D., John de J. Pemberton, B.A., M.D., M.S. in Surgery, Walter E. Sistrunk, Phm.G., M.D.; Assistant Professors Stuart W. Harrington, M.D., M.S. in Surgery, James R. Learnmouth, M.B., Ch.M., F.R.C.S., John S. Lundy, B.A., M.D., Fred W. Rankin, M.A., M.D., Waltman Walters, M.D., M.S. in Surgery; Instructors Winchell McK. Craig, B.A., M.D., Claude F. Dixon, B.S., M.D., M.S. in Surgery, Charles F. McCuskey, M.D., Fred L. Smith, M.D.

Dr. William J. Mayo, being a regent of the University, is not a member of the instructional staff. His services in instruction and conference, however, are available.

The opportunities for preparation in surgery in the Mayo Foundation are principally in the field of surgical pathology, in general and surgical diagnosis and in operative and experimental surgery. For work in pathology see the Department of Pathology. For work in surgical diagnosis see the Department of Medicine.

Fellows majoring in surgery usually select pathology as their minor. This the faculty recommends tho a minor may be taken in any other supporting pre-clinical field.

Men majoring in surgery usually begin their work with three or six months in postoperative care of ambulatory patients; with six months in pathologic anatomy; with six months in surgical pathology; or with a year's



work in general diagnosis. This general diagnostic work is divided into two services of six months each. Anyone desiring more diagnostic work may take an additional half year. Fellows select the diagnostic sections in which they desire to work and their requests are followed so far as arrangements of the schedule will permit. The work in the minor field, pathology, anatomy, or physiology, and at least one year of diagnostic work should be completed before the fellow begins his operative service, at the Colonial, Kahler, or St. Mary's Hospital.

Operating room service for fellows in general surgery is given at St. Mary's, Kahler, and Colonial hospitals. The Kahler Hospital of 150 beds is at present utilized for the observation and surgical treatment of goiter, under the direction of Dr. Plummer, Dr. Pemberton, and Dr. Sistrunk. A limited amount of general surgery is also done in this hospital. Fellows on this service are charged with the pre-operative and postoperative care of the patients and act as second assistants in the operating room.

The Colonial Hospital of 325 beds is utilized for general surgery, including practically all the emergency surgery, and a large part of the surgery of certain specialists: neurology (Dr. Adson, and Dr. Craig), the thorax (Dr. Harrington), orthopedics (Dr. Henderson, Dr. Meyerding, and Dr. Jones), and urology (Dr. Hunt and Dr. Walters). During the fellow's service at the Colonial he acts as second assistant in the operating rooms and may have an opportunity to act as first assistant.

St. Mary's Hospital contains 600 beds, 400 of which are available for general surgery. During the fellow's service in this hospital he works in various rooms as second assistant, and may have opportunity of acting as first assistant.

In their operative service fellows act as second assistants for a period of six months to one year. The service also includes postoperative care of all patients in the operating room in which the fellow is on service. During this service the fellow works in various rooms as second assistant and has occasional opportunity to act as first assistant. All second assistants are resident in the hospitals in which they are on operative service.

Fellows who are considered best qualified are appointed first assistants for a period of one or two years. This service may begin during the third year of residence. There are eleven such first assistantships available. There are also three positions as house surgeon open to competent fellows. House surgeons act as alternate first assistants.

Besides the work already mentioned opportunities are offered for work in urology, roentgenologic diagnosis, orthopedics, neurology, maxillofacial surgery, animal experimentation, X-ray and radium therapy, and regional anesthesia.

It will thus be seen that fellows in surgery may find it desirable to remain for longer than the minimum of three years. Recently the average residence is about four years, tho this is not required.

M152f,w,s,su. Postoperative Care of Patients. Treatment of complications, surgical and medical. Dr. Sistrunk, Dr. Smith.

- M153f-w,w-s,s-su,su-f. Operative Surgery. Second assistantship in operating rooms; occasional substitute service as first assistant. Dr. Balfour, Dr. Judd, Dr. Mayo, Dr. Adson, Dr. Hunt, Dr. Masson, Dr. Pemberton, Dr. Sistrunk, Dr. Harrington, Dr. Rankin, Dr. Walters, Dr. Dixon.
- M154f,w,s,su. Surgery of the Abdominal Organs and the Ductless Glands. Operative technic; study of special problems involved. Dr. Mayo.
- M155f,w,s,su. Surgery of the Abdominal and Genitourinary Organs. Operative technic; study of special problems involved. Dr. Hunt.
- M156f,w,s,su. Surgery of the Gastrointestinal Tracts and Pelvic Organs. Operative technic; study of special surgical problems. Dr. Balfour.
- M157f,w,s,su. Surgery of the Thoracic Organs. Operative technic; study of special problems involved. Dr. Harrington.
- M158f,w,s,su. Surgery of the Central Nervous System. Operative technic and study of special problems involved. Dr. Adson, Dr. Learnmouth, Dr. Craig.
- M159f,w,s,su. Intravenous Medication. The work in intravenous therapy offers a large field for the study of problems related to blood physiology, the blood dyscrasias, and the causes and prevention of reactions following such therapy. Dr. Pemberton, Dr. Huffman.
- M160f,w,s,su. Regional Anesthesia. The technic of field block and nerve block procedures will first be practiced upon the cadaver while the student observes the performance of the work on patients. During the latter half of the term opportunity will be provided for the student himself to perform these anesthetic procedures as part of the pre-operative preparation on patients at St. Mary's, Colonial, and Kahler hospitals. Dr. Lundy, Dr. McCuskey.
- M161f,w,s,su. Surgical Technic. The purpose of this course is to develop surgical technic. The fellows are paired and one operates while the other assists in performing the classical operations adaptable to experimental surgery. Two afternoons per week each quarter. Open only to fellows in surgery. Dr. Mann.
- M162f,w,s,su. Proctology. Dr. Buie.
- M249f,w,s,su. Research Work on assigned problems in experimental physiology. Dr. Mann.
- M250f,w,s,su. Applied Physiology. Demonstrations of physiological procedures and processes which are of value in relation to clinical medicine. Dr. Mann.
- M251f,w,s,su. Applied Pathology. Demonstrations of pathological procedures and processes which are of value in relation to clinical medicine. Dr. Mann.
- M252f,w,s,su. Surgical Research. Investigation of special problems in surgery. Open only to fellows of the department. Dr. Mann.
- M253f,w,s,su. Research Work on assigned problems in experimental pathology. Dr. Mann, Dr. Bollman.
- M254f,w,s,su. Surgical Seminar. Conference for the discussion of original work, problems, and surgical literature. Staff.

## ORTHOPEDIC SURGERY

## A. COURSES OFFERED AT THE MEDICAL SCHOOL

Associate Professor Emil S. Geist, M.D., F.A.C.S.; Assistant Professor Carl C. Chatterton, M.D., F.A.C.S.

214f,w,s. Orthopedic Service. Three months' service as house surgeon in the State Hospital for Crippled and Deformed Children at Phalen Park. Special facilities for the study of orthopedic diagnosis and treatment. Dr. Chatterton.

215f,w,s. Orthopedic Diagnosis and Treatment. History taking, physical examination, treatment, application and use of plaster of Paris casts and braces. The graduate student acts as assistant in the clinic. Not offered in 1928-29. Dr. Geist.

## B. COURSES OFFERED IN THE MAYO FOUNDATION

Professor Melvin S. Henderson, M.D., F.A.C.S.; Associate Professor Henry W. Meyerding, M.D., M.S. in Orthopedic Surgery, F.A.C.S.; Assistant Professor Hugh T. Jones, B.A., M.D., M.S. in Orthopedic Surgery; Instructor Henry J. Fortin, B.A., M.D.

Orthopedic surgery in the Mayo Foundation embraces not only the deformities of childhood but practically all deformities of the extremities and the spine in the adult. Fractures, recent and old; osteomyelitis, acute and chronic; bone tumors, cervical ribs, and so forth, that usually are relegated to general surgery are taken care of in the orthopedic service. In addition all the usual congenital deformities, such as club feet, dislocated hips, torticollis, and so forth are seen on this service. The surgeon who is to cope successfully with such a broad field of surgery must have a sound general surgical training. On account of the breadth of this service and the close association with general surgery as it is ordinarily understood, five places are held for fellows in general surgery. These include the position of house officer at St. Mary's Hospital where a service of thirty-five beds is maintained and a like position at the Colonial Hospital where a service of fifty beds is maintained. Here the hospital care of orthopedic patients is carried on. All emergency cases such as recent and compound fractures, acute osteomyelitis, etc., are also taken care of. The remaining three services for general surgery are confined to orthopedic diagnosis, treatment of non-operative patients, manufacture and fitting of braces, and out-patient and postoperative service. Careful history taking and complete general examinations are done on all patients.

Six three-year services are available for fellows showing special adaptability for orthopedic surgery. Such fellows will have one year in diagnosis, at least one year in orthopedic surgery, three months to one year in general surgery, and a minor either in pathology, anatomy, or neurology. Ample opportunity will be given the men majoring in orthopedic surgery for first assistantship in the operating room and in the office.

In connection with the examining rooms at the temporary offices is a brace shop and special shoe shop where braces and shoes are made. Thus

ample opportunity is given for the study of the manufacture and use of orthopedic appliances. A department of physiotherapy is equipped and maintained also in connection with the section, so that gymnastics and exercises can be given and the postoperative care can be followed to completion. If a fellow has a problem that demands experimental work in its study, special time off can be arranged so that it can be carried out properly under the direction of the head of the experimental laboratory.

M163f,w,s,su. Orthopedic Diagnosis. History taking and physical examination of orthopedic cases. Study of braces, material and construction, measurements and fitting; application and use of plaster of Paris; interpretation of radiograms of orthopedic cases; care of non-surgical and postoperative cases. Dr. Henderson, Dr. Meyerding, Dr. Jones, Dr. Fortin.

M164f,w,s,su. Orthopedic Surgery. One year in service is offered to fellows majoring in orthopedic surgery. Dr. Henderson, Dr. Meyerding, Dr. Jones.

M165f,w,s,su. Demonstration of Orthopedic Cases. 24 hours. Dr. Henderson, Dr. Meyerding.

M255f,w,s,su. Seminar in Orthopedic Surgery. Open to fellows of the department. 12 hours. Dr. Henderson.

#### UROLOGY

##### A. COURSES OFFERED AT THE MEDICAL SCHOOL.

Associate Professor Franklin R. Wright D.D.S., M.D., F.A.C.S.; Assistant Professor Gilbert J. Thomas, M.D.; Instructor Frederick E. B. Foley, Ph.B., M.D.

218f,w,s. Urologic Diagnosis. History taking, physical examination, and case study in diseases of the genitourinary tract. Dr. Wright, Dr. Thomas, Dr. Foley.

219f,w,s. Cystoscopy and Urethroscopy. Cystoscopic examination; urethral catheterization; kidney function study; pyelography; intravesical operations; fulguration. Dr. Wright, Dr. Thomas.

##### B. COURSES OFFERED IN THE MAYO FOUNDATION

Professor William F. Braasch, B.S., M.D.; Associate Professors H. Carey Bumpus, Jr., Ph.B., M.D., M.S. in Urology, John L. Crenshaw, M.D.; Assistant Professor William H. von Lackum, B.S., M.D., Instructor Benjamin H. Hager, B.S., M.D., M.S. in Urology, Louis G. Stuhler, M.D.

Opportunity for graduate instruction in urology is offered as a major and as a minor course. Those fellows having had advanced work in the fundamental sciences or who are otherwise unusually well qualified will be given preference.

The major course in urology extends over a period of three years, which includes one and one-half years devoted to the diagnosis and treatment of diseases involving the urinary tract in the Section of Urology,

six months to one year in operative surgery, and at least six months in pathology. The course is designed to provide a thoro experience in the diagnosis and treatment of diseases involving the urinary tract. Opportunity is given to spend additional time in the study of the anatomy and physiology of the urinary tract, and in experimental work.

Urologic diagnosis and treatment, including cystoscopy, urethroscopy, urography, fulguration, diathermy, removal of foreign bodies, lithotripsy, ureteral manipulation, pelvic lavage, radium treatment, and so forth, are conducted daily in the cystoscopic rooms on the second floor of the Kahler. A suite of ten rooms in the south wing of the Kahler is devoted to this purpose. These rooms have been equipped with the latest devices for urologic diagnosis and treatment. They also include a special urologic laboratory and library. The technical work is carried on during the mornings under the supervision of Dr. W. F. Braasch, Dr. J. L. Crenshaw, Dr. H. C. Bumpus and Dr. B. H. Hager. The fellow is given an opportunity personally to examine patients and familiarize himself with the diagnosis of a wide range of diseases affecting the urinary tract. More than six thousand cystoscopic examinations have been made in these rooms annually in recent years. Of this number a comparatively small percentage were negative and the pathology involved was largely of a surgical nature. The afternoon is devoted to history taking and physical examinations of patients suffering from diseases of the urinary tract and allied conditions, in the examining rooms of the Mayo Clinic. The close relation of this work to general diagnosis broadens the field and affords the fellow a breadth of clinical vision which he might not otherwise have. This service extends over a period of twelve months, which is divided into junior and senior services.

The diagnostic experience is also enlarged by a service of six months as resident in the urologic wards of the Colonial Hospital. In these wards he has an opportunity to study the pre-operative and postoperative treatment of urologic conditions, as well as the clinical study and urologic diagnosis of patients kept under observation in the Colonial Hospital.

The surgical training consists of work as second assistant in general and urologic surgery. Here opportunity is given to observe a large number of patients operated for diseases involving the urinary tract and associated organs. Additional opportunity is offered to assist in operations for general surgical conditions, and particularly general abdominal surgery.

Instruction in pathology similarly includes a great variety of pathological conditions involving the urinary tract, as well as those embraced in general pathology. The courses in pathology offered are general pathology with Dr. Wilson, surgical pathology with Dr. MacCarty and Dr. Broders and staff, and pathologic anatomy under Dr. Robertson and staff.

Opportunities for research work on problems in bacteriology of the genitourinary tract are provided under the supervision of Dr. Rosenow, Dr. Sanford, and Dr. Magath.

Fellows in urology are encouraged to keep in touch with current literature and the facilities of a large and complete library are offered to

them, not alone in the library of the section, but in the general library of the Mayo Clinic.

In the investigation of clinical problems, opportunity is offered for reviewing records in the record room of the Mayo Clinic, where records of some half million patients are kept. Special cross files on cases involving the diseases of the urinary tract are kept in special rooms, permitting of thoro study of the clinical records of these conditions.

The fellow in urology is expected to be interested in experimental work and is given every opportunity to do this work in the experimental laboratories under the direction of Dr. F. C. Mann. In the laboratory for this purpose every opportunity is given for experimental work in physiology and other work, in our attempt to solve the problems involved in urologic diagnosis.

At the temporary offices Dr. von Lackum has charge of a urologic service, which involves the diagnosis and treatment of inflammatory infections of the urethra. Every opportunity is given for the careful study and treatment of urethritis and complications, and each fellow is expected to spend at least three months on this service.

Special attention is given to urography, including pyelography, ureterography, cystography, and urethrography. A considerable experience in interpretation is necessary in order to make this diagnostic feature of value. During the past year over a thousand urograms were made in the cystoscopic rooms. A special technician is attached to the urologic section, who devotes his time largely to urography and special roentgenograms of the urinary tract. The services of Dr. A. B. Moore, and Dr. C. G. Sutherland of the Department of Radiology are available for consultation.

Every day there is a conference of the urologic staff, during which time the problems arising during the morning are discussed and the cases reviewed.

A seminar covering the current urologic medical literature is held at stated intervals, in which all members of the section take part.

*Minor course.*—The course is open to a limited number of fellows (two annually) who are majoring in general surgery. It consists of a diagnostic service in the Section of Urology, extending over a period of six months.

M166f,w,s,su. Urologic Diagnosis. Cystoscopic examination and history taking in diseases of the genitourinary tract. Dr. Braasch, Dr. Bumpus, Dr. Crenshaw, Dr. Hager.

M167f,w,s,su. Cystoscopy, Urethroscopy. Cystoscopic examination; urography; endoscopic operations; fulguration. Dr. Braasch, Dr. Bumpus, Dr. Crenshaw, Dr. Hager. (One and one-half years or more of service is offered as a part of a three-year fellowship for those desiring to specialize in urology.)

M168f,w,s,su. Special Urologic Treatment. A course of three months is offered in the study and treatment of infections of the urethra and adnexa. This course may be taken by those who are enrolled in

either the major or the minor course in urology. Dr. von Lackum, Dr. Stuhler.

#### PROCTOLOGY

##### B. COURSES OFFERED IN THE MAYO FOUNDATION

Associate Professor Louis A. Buie, B.A., M.D.

Proctology is a major field in the University of Minnesota. The section on proctology in the foundation offers excellent opportunities for the study of diseases of the intestinal tract. The service includes about 6,000 examinations and 750 operations annually. The patients come to the section by reference from other departments. They have usually been studied from every medical angle so that the opportunity to study the relationships and background of the specialty, as well as the immediate diagnostic problems, is unusually good. The major service in proctology extends over a period of three to four years, and includes a minimum of six months in a minor, usually pathology, approximately one year in general medical and surgical diagnosis with special reference to diseases of the intestines, three months in one or each of the sections concerned with regional anesthesia with special reference to sacral anesthesia, diagnostic roentgenology, radium treatment of malignant and other conditions, and one to two years in the diagnosis and treatment of diseases involving the intestinal tract in the section on proctology. Opportunity is given for additional time to be devoted to the study of the physiology or anatomy of the intestinal tract or for experimental work.

M169f,w,s,su. Proctology. Dr. Buie.

#### DENTAL SURGERY

##### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Research Professor Thomas B. Hartzell, D.D.M., M.D.

206f,w,s,su. Research in Mouth Infections. A study of dental and parodontal infections as related to systemic disease. Experimental study to determine the lesions produced in animals by bacteria from these sources. Dr. Hartzell.

##### B. COURSES OFFERED IN THE MAYO FOUNDATION

Associate Professor Boyd S. Gardner, D.D.S.; Instructor Louis T. Austin, D.D.S.

The work in dental surgery in the Mayo Foundation is designed primarily for fellows or special students who are graduates in dentistry and who are majoring in dental surgery. The work is also open to graduate medical students.

## OBSTETRICS AND GYNECOLOGY

## A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professors Jennings C. Litzenberg, B.S., M.D., F.A.C.S., Chief, Fred L. Adair, B.S., M.A., M.D., F.A.C.S.; Associate Professor John L. Rothrock, M.A., M.D., F.A.C.S., Assistant Professor Lee W. Barry, M.D., Ph.D., F.A.C.S.

Of the courses in other departments open to graduate medical students, the following are especially recommended for those desiring to specialize in obstetrics and gynecology.

Anatomy 133f, and 134f,s,su. Fetal Anatomy. Dissection of fetus and new-born.

Anatomy 137f,w,s. Implantation and Placentation.

Anatomy 153f-154w-155s-156su. Advanced Anatomy. Gross and histological, of the female generative organs and abdomen.

Pathology 118s. Gynecological Pathology.

Pharmacology 104, 109a,b. Experimental Pharmacology.

Physiology 153f,w,s,su. Advanced Physiologic Chemistry.

Other courses in fundamental or clinical subjects may be elected.

The following graduate courses are offered in the Department of Obstetrics and Gynecology (at Minneapolis):

- 117f-118w-119s-120su. Advanced Pathology of the Female Generative Organs. Required of first or second year fellows in obstetrics and gynecology. Prerequisite: Pathology 108, or equivalent. Dr. Adair.
- 121f-122w-123s-124su. Clinical Obstetrics and Gynecology. A course in diagnosis and treatment, with special study of selected cases. Clinic in the Out-Patient Department of the University Hospital, MWF, throughout the year. Required of first year fellows and may be elected by second year fellows. Dr. Litzenberg and dispensary staff.
- 125f-126w-127s-128su. Clinical Obstetrics and Gynecology. Similar to Course 111-114, but on TThS. Required of second year fellows, and may be elected by first year fellows. Dr. Litzenberg and staff.
- 201f-202w-203s-204su. Advanced Obstetrics and Gynecology. Includes service in the University Hospitals or Minneapolis General Hospital, affording ample opportunity for experience in diagnosis, care, and treatment (operative and non-operative) of patients. Special facilities are offered for study of problems and cases of unusual interest. Required of first year fellows. Dr. Litzenberg, Dr. Adair.
- 205f-206w-207s-208su. Similar to Course 201-204, but more advanced, both in clinical and research aspects of the subjects adapted to the increased training and experience. Required of second year fellows. A special fellowship may be taken in the Swedish Hospital during the second year under Dr. Adair. Dr. Litzenberg, Dr. Adair.
- 209f-210w-211s-212su. Similar to Courses 201-204 and 205-208 but more advanced. Required of third year fellows. Dr. Litzenberg, Dr. Adair.
- 213f-214w-215s. Seminar. A conference, including the fellows and graduate students. Presentation and discussion of original work and reports



upon the current literature in obstetrics and gynecology. Reading knowledge of French and German is necessary. Dr. Litzenberg.  
 216f-217w-218s-219su. Research. Clinical and laboratory research upon problems in obstetrics and gynecology. Required of third year fellows, who must complete a satisfactory thesis during the year. Elective for second year fellows or other properly qualified graduate students. Dr. Litzenberg, Dr. Adair.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

Professor Robert D. Mussey, M.D.; Assistant Professor Leda J. Stacy, M.D.; Instructor Lawrence M. Randall.

Limited opportunities for work in obstetrics are available with Dr. Mussey.

M251f,w,s,su. Clinical Obstetrics and Gynecology. Diagnosis and treatment with special study of selected obstetric cases. Dr. Mussey, Dr. Randall.

Opportunities for diagnostic work in gynecology are available with Dr. Stacy and Dr. Mussey. (See M168 and M260 in the Department of Medicine.)

Operative work in gynecology in the Mayo Foundation is not segregated in any surgical section. It is therefore impossible to offer opportunity for special study in this field.

#### OPHTHALMOLOGY AND OTO-LARYNGOLOGY

The graduate courses in these subjects are designed to prepare selected men for advanced work in the various lines, to prepare them for practice in these specialties, and to develop research and productive work in these subjects.

Of elective courses in other departments, the following are highly desirable.

Physics of Light and Acoustics

Advanced Optics

Advanced Anatomy of the Head and Neck

Topographic Anatomy of the Head and Neck

Developmental Anatomy of the Head

Advanced Histology and Neurology of the Eye, Ear, Nose, and Throat

Advanced Physiology of the Vision and Hearing

Physiologic Optics Seminar

Special Pathology of the Eye, Ear, Nose, and Throat

Immunity

Advanced Neuropathology

The Department of Ophthalmology and Oto-Laryngology in the Medical School, also offers a one-year course, to properly qualified graduate students, *beginning with the fall quarter*. This course is designed to give graduate students training in the fundamentals (special anatomy, histology, embryology, pathology, physiology of special senses, physio-

logic optics) and clinical teaching in the Out-Patient Department in diagnosis and treatment. On the completion of this one-year course, students are urged to continue their work as residents in special hospitals, or further graduate clinical work in recognized institutions. Tuition fee for this course is \$75 per quarter for residents of Minnesota (or \$100 for non-residents).

#### A. COURSES OFFERED AT THE MEDICAL SCHOOL

##### OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Professor Frank E. Burch, M.D., F.A.C.S., Head; Associate Professor Horace Newhart, B.S., M.D., F.A.C.S.; Assistant Professors Walter E. Camp, M.A., M.D., F.A.C.S.; Fred J. Pratt, M.D., F.A.C.S.; John A. Pratt, M.D., F.A.C.S.

- 100f. Refraction. Lectures and demonstrations on the theory of refraction. 22 hours. Dr. Lewis, Dr. Fink, Dr. Herbolzheimer.
- 101f,w,s,su. Advanced Refraction. Practical work in the refraction clinics at the University and Wilder dispensaries. Dr. Lewis, Dr. Fink, Dr. Herbolzheimer.
- 102f,w,s,su. Clinical Ophthalmology. Diagnosis and treatment of diseases of the eye. Daily attendance at the dispensaries. 132 hours per quarter. Dr. Burch, Dr. Camp, Dr. Clark, Dr. Macnie, Dr. Strout.
- 103f. Ocular Muscles. 18 hours. Dr. Burch.
- 104w. Perimetry. 18 hours. Dr. Macnie, Dr. E. J. Borgeson.
- 105w,s. Ophthalmoscopy. 22 hours. Dr. Grant.
- 106f. Operative Surgery of the Eye. Operations on the cadaver and animal eyes. 18 hours. Dr. John Brown.
- 107s. Neuro-Ophthalmology. Lectures and demonstrations. 18 hours. Dr. J. C. McKinley.
- 108f. Seminar in Physiologic Optics. For graduate and medical students. Prerequisite: Course 104 or equivalent. 22 hours; 2 credits. Dr. Lyon.
- 109w. Seminar in Physiology of the Senses. For graduate and medical students. Prerequisite: Course 104 or equivalent. 11 hours; 1 credit. Dr. Lyon.
- 110f,w,s,su. Surgery. Operative clinic in the University Hospital. 32 hours per quarter. Daily service in the University Hospital. Required of second and third year fellows, who will serve as assistants in operative and other clinical work. Dr. Burch, Dr. Camp, Dr. Clark, Dr. Hansen, Dr. Macnie, Dr. Phelps, Dr. Strout, Dr. Fjelstad.
- 120f,w,s,su. Clinical Otolology, Rhinology, and Laryngology. Diagnosis and treatment of diseases of the nose and throat. Daily attendance in the dispensaries. 132 hours per quarter.
- 122w. Operative Surgery of the Nose and Throat. Dr. F. J. Pratt, Dr. J. A. Pratt.
- 123w. Roentgenology of the Accessory Sinuses and Localization of Foreign Bodies within the Eye. 10 hours. Dr. Rigler.
- 124w,s. Functional Ear Tests. 11 hours. Dr. Connor.
- 125w,s. Diseases of the Labyrinth. 11 hours. Dr. Newhart.

- 126w,s. Endoscopy. Lectures and demonstrations. 18 hours. Dr. Phelps.
- 127w. Operative Surgery of the Ear. Dr. Newhart, Dr. Hansen.
- 128f,w,s. Library and Quiz Courses in Otolaryngology, and Ophthalmology. Dr. Lewis, Dr. Berrisford, Dr. Connor.
- 129s. Biomikroskopy with the Slit Lamp and Ophthalmoscopy with the Gullstrand Instrument. 32 hours. Dr. Morseman.
- 200w,s. Seminar in Ophthalmology and Oto-Laryngology. Conducted by members of the staff and open to fellows and all qualified graduate students of the Medical School.
- 201f,w. Pathology of the Eye, Ear, Nose, and Throat. Laboratory work with materials from fresh and mounted specimens and demonstrations with the euscope. 44 hours. Dr. Camp, Dr. Connor.
- 202f,w,s,su. Research. Required of second and third year fellows who must complete a satisfactory thesis, based upon original work.
- 204f,w,s,su. Advanced Oto-Laryngology. Daily service in the University Hospital. Required of second and third year fellows, who will serve as teaching assistants in operative and other clinical work. Dr. Hansen, Dr. Phelps, Dr. Fjelstad.

## B. COURSES OFFERED IN THE MAYO FOUNDATION (ROCHESTER)

## OPHTHALMOLOGY

Professor William L. Benedict, M.D.; Assistant Professors Walter I. Lillie, M.D., M.S. in Ophthalmology, Avery D. Prangen, B.S., M.D., Henry P. Wagener, M.D., M.S. in Ophthalmology.

Fellows majoring in ophthalmology in the Mayo Foundation spend from six to nine months on the physics of light, physiologic optics, and anatomy, pathology, and bacteriology of the eye in the Medical School in Minneapolis. The remainder of their service is composed of the following:

- M151f,w,s,su. Clinical Ophthalmology. External diseases of the eye, ophthalmoscopy, ophthalmic surgery. Dr. Benedict.
- M152f,w,s,su. Refraction and Ophthalmic Myology. Theory of refraction, retinoscopy, diagnosis of refractive errors of the eye, prescribing of lenses, practical work on patients under supervision of instructor. Eye movements, disturbances of motility of the eyes. Dr. Prangen.
- M153f,w,s,su. Medical Ophthalmology. Ophthalmology in relation to general diseases. Dr. Benedict.
- M154f,w,s,su. Neuro-Ophthalmology. Ophthalmology in relation to diseases of the nervous system. Physiology of the eye, psychology of vision, functional eye disturbances. Dr. Lillie, Dr. Wagener.
- M155f,w,s,su. Pathology of the Eye. Dr. Benedict.
- M156f,w,s,su. Physiological Optics. Fundamental laws and principles of catoptrics and dioptrics. Qualitative and quantitative determinations of retinal functions. Binocular and monocular vision. Dr. Sheard.

NOTE.—Laboratory facilities for research in pathology and bacteriology of the eye, animal experimentation; demonstrations; weekly seminars held

jointly by sections on Ophthalmology, Oto-Laryngology and Rhinology, and Laryngology, Oral and Plastic Surgery.

#### OTO-LARYNGOLOGY AND RHINOLOGY

Professors Harold I. Lillie, B.A., M.D., Gordon B. New, D.D.S., M.D.; Assistant Professor Bert E. Hempstead, B.A., M.D.; Instructors Carl M. Anderson, M.D., Fred A. Figi, M.D., W. Berkeley Stark, M.B., M.S. in Oto-Laryngology.

M157f,w,s,su. Diagnostic and Out-Patient Service. Diagnosis of neoplasms of the nose, throat, mouth, and neck. Plastic surgery of face and neck (pre-operative and postoperative treatment). Advanced laryngology as related to neurology and general medicine. Six months. Dr. New, Dr. Figi.

M158f,w,s,su. Hospital Service. Internship in Worrell Hospital. Operative and other treatment of tumors of the nose, throat, and mouth. Plastic surgery of the face and neck (operative). Six months. Dr. New.

M159f,w,s,su. Clinical Oto-Laryngology and Rhinology. Theory and practice with differential diagnosis of diseases of the ear, nose, accessory sinuses, pharynx, and larynx and their relations to general diagnosis. Half time for approximately twenty-seven months. Dr. Lillie, Dr. Hempstead, Dr. Anderson, Dr. Stark.

M160f,w,s,su. Pre-operative and Postoperative Care of Patients. Treatment of complications. Half time for nine months. Dr. Lillie, Dr. Hempstead, Dr. Anderson, Dr. Stark.

M161f,w,s,su. Operative Oto-Laryngology and Rhinology. Internship, second assistantship in operating service in Worrell Hospital. Half time for nine months. Dr. Lillie, Dr. Hempstead.

M162f,w,s,su. Operative Oto-Laryngology and Rhinology. First assistantship in operative service in Worrell Hospital. Half time for nine months. Dr. Lillie, Dr. Hempstead, Dr. Anderson, Dr. Stark.

M163f,w,s,su. Physics of Sound. Elasticity and vibrations. Transverse and longitudinal waves. Interference and resonance. Musical notes, organ pipes, rods. Acoustical measurements. The physical principles of hearing. Recent researches in audition. Dr. Sheard.

M251f,w,s,su. Pathology. Opportunity will be given fellows during the service to study the gross and microscopic pathology of tumors of the nose, throat, and mouth in connection with the clinical material. Dr. New, Dr. Broders.

#### RADIOLOGY

##### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Professor Henry A. Erikson, Ph.D.; Associate Professor Karl W. Stenstrom, Ph.D. (Physicist to Cancer Institute); Assistant Professor Robert G. Allison, M.D.

Graduates of Class A schools who have completed at least one year's satisfactory internship in a recognized hospital are eligible for an ap-

pointment as a fellow in radiology. The student must carry one major and two minor branches. The major shall be in radiology and one of the minor branches must be in physics. The course extends over a period of three years. The course in radiology covers the use of the X-ray as a means or aid to diagnosis in all branches of medicine. In addition the use of both superficial and deep radiation in therapy is taught.

The X-ray departments of the following hospitals are all fully equipped with modern diagnostic and therapeutic equipment, and are available to fellows in radiology.

1. *University Hospital*.—Offers unusual clinical material of a chronic nature. There is an immense amount of material available in gastrointestinal, chest, bone, and urological diagnosis. Unusual opportunity is given the student for pre-operative study of the case and postoperative study of the material removed at operation. The Dermatological Department furnishes a large number of both acute and chronic skin diseases for treatment.

2. *Minneapolis General Hospital*.—This institution offers an immense amount of material in acute and chronic diseases. There is an exceptional amount of work in acute respiratory and cardiac diseases. There is a very large fracture service in this institution.

3. *Glen Lake Sanatorium*.—This institution with its 500 beds devoted to the treatment and diagnosis of all types of tuberculosis, offers the student excellent opportunity to follow both the clinical and radiological course of the diseases while undergoing treatment. Routine X-ray examinations, both pulmonary and gastrointestinal, are done on admission and at intervals during the patient's stay in the institution.

4. *Lymanhurst School*.—Routine physical and X-ray examinations of all school children suspected of having pulmonary tuberculosis are conducted at this institution. The student is given an unusual opportunity to correlate the physical and X-ray findings in childhood tuberculosis.

5. *The Cancer Hospital*.—This hospital is situated on the University campus and has an initial capacity of fifty beds. It is devoted entirely to deep Roentgen ray and radium therapy. It is fully equipped with the newest types of deep therapy machines. A radium emanation plant is housed in this building. This institution is run and directed by the staff of the University Hospital. The student here obtains experience in Roentgen and radium therapy. He is also taught the collection and use of radium emanation.

201f,w,s. Physics of Roentgenology. Instructions will be given in electricity including the electron theory and electrical phenomena in gases so that a clear understanding of the Roentgen machines may be acquired. The principles of other Roentgen equipment will be explained. The proper methods for controlling the production of rays in Roentgen tubes and for measuring the intensity of the rays will be demonstrated, also the making and usage of charts showing the distribution of radiation inside the body. Problems referring to the protection against exposure to the rays will be thoroly discussed. Dr. Stenstrom.

- 203f,w,s. Physics of Radium Therapy. An outline of the atomic theory and of the radioactive transformations will be given. The concentration, measuring, and handling of emanation will be demonstrated. The application of radium and emanation will be discussed and the calculation of dosage will be taught. Special attention will be given to problems of filtration and protection. Dr. Stenstrom.
- 205f,w,s. Physics of Light Therapy. The undulation theory and the electromagnetic theory of radiation will be briefly reviewed and spectroscopy discussed. The relation between wave length and absorption of the rays by certain inorganic and organic material especially by tissues will be outlined. The difference in the light from different sources, i.e., from a quartz mercury lamp and a carbon arc lamp, will be demonstrated. The management of such lamps will be taught and also the arrangement for treatments. Dr. Stenstrom.
- 207f,w,s. Roentgen Therapy. Fellowship men will have an opportunity to treat patients under supervision both with medium and high voltage machines. All problems in connection with these treatments will be thoroly discussed. Dr. Stenstrom, Dr. Allison.

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

Associate Professor Alexander B. Moore, M.D.; Assistant Professors Arthur U. Desjardins, M.D., M.S. in Rad., Charles G. Sutherland, M.B.; Instructors Harry H. Bowing, B.S., M.D., Frances A. Ford, B.S., M.D., M.S. in Medicine, Byrd R. Kirklin, M.D., Albert Miller, M.D.

The following course is recommended as the minimum for which fellowships in radiology will be granted in Mayo Foundation.

- M151f,w,s,su. At least three months in general roentgenologic technic. Practical experience in all varieties of roentgenologic apparatus including transformers, vacuum tubes, tables, plates, films, intensifying screens, and so forth. This training in roentgenologic technic is intended to prepare the fellow to make roentgenograms in connection with his subsequent work. Unless the fellow proposes to take physics as his minor, he must also, during this period, become somewhat acquainted with the physics of the Roentgen ray. Dr. Moore, Dr. Sutherland, Dr. Kirklin.
- M152f,w,s,su. At least eighteen months in applied roentgenology. The student will be given opportunity to become familiar with the roentgenography of the osseous system, chest, heart, lungs, and urinary system, and with special technics required in roentgenography of the accessory sinuses, mastoids, teeth, genitourinary tract, ventricles of the brain, and other special anatomical regions. Unusual facilities and material are at hand for the roentgenoscopy and roentgenography of the gastrointestinal tract. Thoro training is obtainable in the reading of plates and screen images, the recognition of normal and abnormal conditions, the Roentgen signs of disease, both direct and indirect, roentgenologic diagnosis, the correlation of plate and screen findings, and

the correlation of clinical and roentgenologic findings. During this period of eighteen months fellows have brief services in rotation with the departments of Urology, Obstetrics and Gynecology, Neurology, and Dental Surgery. Dr. Moore, Dr. Sutherland, Dr. Kirklin, Dr. Miller.

M153f,w,s,su. At least six months in Roentgen therapy. Courses 3 and 4 may be taken in inverse order. Dr. Desjardins, Dr. Ford.

M154f,w,s,su. At least three months in radium therapy. Dr. Bowing.

M251f,w,s,su. At least three months in each of two of the following subjects: physics, normal anatomy, or physiology, or at least six months in pathologic anatomy as a minor. During these six months in his minor field the fellow will be expected to apply his knowledge, which he has previously obtained, of roentgenologic technic. Dr. Sheard, Dr. Lundy, Dr. Mann, Dr. Robertson, Dr. Mills.

M257f,w,s,su. Seminar. Interpretation of Roentgenologic Findings. This very important field of roentgenology receives particular attention. Thoro training is given in the reading of plates and screen images, the recognition of normal and abnormal conditions, the Roentgen signs of disease, both direct and indirect, roentgenologic differential diagnosis, the correlation of plate and screen findings, and the correlation of clinical and roentgenologic findings. In addition to the large current material, an extensive file of lantern slide reductions, exemplifying a wide variety of disease conditions, is accessible for study and comparison. Dr. Sutherland.

While the above outlined schedule of three years is the briefest for which fellowships will be granted, a prolongation of residence in one or more of the fields scheduled to a total of four or more years is highly desirable. After the satisfactory completion of the above outlined minimum schedule, fellows are eligible for such first assistantships in radium therapy, Roentgen therapy, or general roentgenology as may be vacant. These first assistantships are for a period of one year in a department. The stipend is \$2000.

## PREVENTIVE MEDICINE AND PUBLIC HEALTH

### A. COURSES OFFERED AT THE MEDICAL SCHOOL

Associate Professors Albert J. Chesley, M.D., Harold S. Diehl, M.A., M.D., J. Arthur Myers, Ph.D., M.D.; Assistant Professors Orianna McDaniel, M.D., E. M. Wade, M.A., H. A. Whittaker, B.A.

Inquiries concerning other work in public health should be addressed to the director, Dr. H. S. Diehl, Millard Hall, Minneapolis.

102. Sanitation. Sanitary supervision of water and milk supplies, sewerage systems and sewage, refuse, and garbage disposal systems. Practical work including field investigations, laboratory examinations, interpretation of results, recommendations to correct unsatisfactory conditions, report writing and office procedure. Open only to graduate students who have had Bacteriology 101; Chemistry 20-21, 27, 31-32; Physics 24, 34, 44. Credits arranged. Mr. Whittaker.

103. Public Health Bacteriology. Modern methods of a public health laboratory in making diagnoses; in the preparation of vaccines, and in research. Prerequisites: Bacteriology 101, 116. Credits arranged. Miss Wade.
104. Epidemiology. Lectures on principles and methods of epidemiological investigation. Analysis of data; methods of reaching conclusions; individual field work; collateral reading. Open only to graduate medical students. Credits arranged. Dr. Chesley, Dr. McDaniel.
106. Public Health Administration. Organization of state, municipal, and voluntary health activities; preparation of budgets; procedures in enforcing quarantine; in correcting unsanitary conditions; in controlling tuberculosis and venereal diseases; value of sanitary surveys, food inspections, etc. Prerequisite: 53 or 101. Credits arranged. Dr. Chesley, Dr. Diehl.
- 107s. Sanitary Surveys. For medical students. Conferences, practical field work and report on a specified survey. Of particular value to practitioners who may be called upon to serve as local health officers. Prerequisite: 53 or 100. 2 credits. Dr. Diehl.
201. Research. Opportunities will be offered by the University and by the various co-ordinated organizations for qualified students to pursue research work. Dr. Diehl and staff.

#### ADDITIONAL COURSES

Other courses offered in this and the Graduate School bulletin which contribute to work in public health:

Course No.	Title	Department	Instructor
107	Protozoology .....	Zoology	Dr. Sigerfoos
144-145*			
146	Animal Parasites and Parasitism	Zoology	Dr. Riley
101	Special Bacteriology .....	Bacteriology	Dr. Larson
114	Higher Bacteria .....	Bacteriology	Dr. Henrick
116	Immunity .....	Bacteriology	Dr. Larson
150-151	Advanced Bacteriology .....	Bacteriology	Dr. Larson
101	Elementary Biometry .....	Botany	Dr. Harris
145	Advanced Biometry .....	Botany	Dr. Harris
170	Development of Young Child ..	Child Welfare	Dr. Anderson
190-191	Mental Examination of Pre-school Children .....	Child Welfare	Dr. Goodenough
135	Physical Development of Childhood .....	Anatomy	Dr. Scammon
160-161-			
162	Seminar in Growth of Children	Anatomy	Dr. Scammon
114-115	Applied Physiology .....	Physiology	Dr. Greisheimer
201	Seminar in Physiology .....	Physiology	Dr. Lyon
183	Genetics and Eugenics .....	Zoology	Arranged
161	Hydrology .....	Sanitary Engineering	Mr. Bass
162-163	Water Supply and Sewerage ..	Sanitary Engineering	Mr. Bass
261-262	Water and Sewage Purification	Sanitary Engineering	Mr. Bass
144-145	Abnormal Psychology .....	Psychology	Dr. Anderson
100	Social Psychology .....	Sociology	Dr. Chapin

#### B. COURSES OFFERED IN THE MAYO FOUNDATION

The only work in Preventive Medicine and Public Health offered in the Mayo Foundation is in connection with the Department of Pediatrics. See statement of that department.



GRADUATE STUDENTS REGISTERED AT THE UNIVERSITY OF MINNESOTA FROM  
JUNE 30, 1926 TO JUNE 30, 1928

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Allen, Raymond B.	B.S. Minn. 24 M.A. Minn. 25		7-29-24		Anat.	An. Biol.
Anderson, Hilding C.	B.S. Minn. 15 M.B. Minn. 18 M.A. Minn. 21	Minn. 4-19	10- 5-20		Path.	Physiol.
Anderson, Leonora	B.S. Minn. 22		12- 4-26	6-15-27	Physiol. Chem.	Anat.
Anderson, Miriam	B.A. Ill. Womens College 17		9-27-26		Prev. Med.	Physiol.
Baxter, Geoffrey H.		Calif. 2-24	9-30-27	12-30-27	Anat.	
Benepe, James L.		Mo. 2-26	9-21-27	12-30-27	Ophth. and Oto.	
Berkwitz, Nathan J.	B.A. Minn. 22 B.S. Minn. 23 M.B. Minn. 24	Minn. 4-25	1-14-26		Medicine	Physiol.
Bessesen, Daniel	B.S. Minn. 19 M.B. Minn. 21	Minn. 4-22	6-30-19		Path.	Anat.
Bieter, Raymond N.	B.S. Minn. 21 M.S. Minn. 24	Minn. 4-24	10- 9-22		Pharm.	Physiol.
Blumenfeld, Chas. M.	B.A. Minn. 26 M.A. Minn. 28		9-26-27		Anat.	Pharm.
Boesel, Reuben J.	B.A. Ohio 18	O. 4-0	4- 1-27	7-31-27	Anat.	Path.
Boyd, Julian D.	B.S. Iowa 16 M.S. Iowa 19	Iowa 3-21	6-19-26	7-30-26	Anat.	
*Brockbank, Thomas W.	A.B. St. Bonaventure 15 A.M. Cath. U. 16 Ph.D. Cath. U. 18	D.C. 2-24	10- 7-26	12-15-26	Neurol.	Path.

† Designation used in directory of the American Medical Association.

\* See Rochester list.

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Brown, Laurence T.	B.A. Colorado 23		6-20-26	7-31-26	Physiol.	
Brown, Milton G.	B.S. Minn. 24 M.B. Minn. 26	Minn. 4-27	1- 5-28		Obstet. and Gynec.	
Brutsch, Geo. C.	B.A. Minn. 24		1- 6-25		Bact.	Path.
Cable, Morris L.	B.S. Minn. 23	Minn. 4-27	9-26-27	3-15-28	Surg.	Path.
Cady, Laurence H.	M.B. Minn. 26 B.A. Minn. 14	Minn. 4-23	4-15-24	6-15-27	Prev. Med. and Pub. H.	
Campbell, Orwood	B.S. Chicago 20	Ill. 1-22	1- 2-24	12-30-26	Surg.	Path.
Cooper, Miles S.	A.B. Macalester 27		9-22-27		Bact.	Paris.
Creevy, Charles D.	B.S. Minn. 24 M.B. Minn. 26	Minn. 4-27	9- 1-27		Surg.	Path.
Crook, Rudolph L.	B.S. Minn. 17 M.B. Minn. 19	Minn. 4-20	1- 3-28	6-15-28	Anat.	
*deCarle, Donald W.	B.S. Minn. 20	Minn. 4-24	9-29-20		Oto-Laryng.	Path.
Decherd, Geo. M.	B.A. Texas 26		9-29-26		Pharmacol.	Physiol.
Dewey, Earl T.	B.A. Minn. 25 B.S. Minn. 26 M.A. Minn. 27		6-11-25	6-15-28	Bact.	Path.
Dickerson, Geraldine	B.A. Minn. 25		10- 9-25	3-15-26	Bact.	
Dodge, Warren M.	B.S. Minn. 25 M.B. Minn. 25	Minn. 4-27	10- 5-27		Ophth.	
Duncan, Donald	B.A. Carleton 23 M.A. Minn. 27		9-30-26		Anat.	Path.
Ehrenberg, Claude	B.S. Minn. 19 M.B. Minn. 19	Minn. 4-20	9-24-24		Obstet. and Gynec.	Anat.
Eklund, Carl M.	B.A. Minn. 25		6- 3-27	3-15-28	Physiol.	Physiol. Chem.
Ericson, Russel W.		Pa. 2-26	4-27-28	6-15-28	Anat.	
Fink, Walter H.	M.S. Pa. 24	Minn. 4-21	11- 2-27		Ophth.	Path.
*Fitzgibbon, Grattan	B.S. Creighton 22	Neb. 6-24	10- 3-27	3-15-28	Surg.	Path.

Gordon, Maurice	B.S. Dartmouth 21		3-28-27		Anat.	
Gray, Royal C.	B.S. Minn. 22	Minn. 4-24	2-24-28		Med.	Physiol.
Green, Beryl S.	B.A. Minn. 20		3-25-20	6-15-28	Bact.	Math.
	M.A. Minn. 21					
Gregory, Raymond	B.A. Texas 22	Pa. 12-24	7-15-25	6-13-27	Pharm.	Physiol.
	M.A. Texas 23					
	Ph.D. Minn. 27					
Hackett, Joseph F.	B.S. Mich. 24	Mich. 1-24	1- 1-26	6-15-27	Obst. and Gynec.	Anat.
Halvorson, Halvor O.	B.S. Minn. 22		9-26-22	6-11-28	Bact.	Physiol. Chem.
	Ch.E. Minn. 23					
	Ph.D. Minn. 28					
Hansen, Arild	B.S. Minn. 22	Minn. 4-25	1-13-26		Ped.	Path.
	M.B. Minn. 24					
Hanson, Lewis	B.S. Minn. 26		9-27-26	6-15-28	Physiol.	Pharm.
	M.A. Minn. 28					
Hanson, Malcolm B.		O. 4-1-25	11-25-26	12-30-26	Radiol.	
Hartig, Hermina	B.S. Minn. 12	Minn. 4-14	1-30-26	3-15-28	Pediatrics	
Herring, Carrie A.	B.S. West Va. 15	O. 4-1-17	9-24-27		Anat.	C.W.
Hesdorffer, Meredith	B.S. Minn. 26	Minn. 4-28	9-24-27		Anat.	Bact.
	M.B. Minn. 28					
Hillstrom, Harry T.	B.S. Minn. 24	Minn. 4-27	7-30-27		Radiology	Physics
	M.B. Minn. 26					
Hutchinson, Dorothy	B.A. Macalester 20	Pa. 12-24	7- 1-25		Medicine	
Hymes, Charles	B.S. Minn. 17	Minn. 4-20	6-22-21	6-15-27	Ophth. and Oto.	Anat.
	M.B. Minn. 19					
James, Herbert H.		Pa. 2-17	1-20-28	3-15-28	Anat.	Path.
Jensen, Harry C.	B.S. Minn. 18	Minn. 4-22	10- 1-26	1- 1-27	Anat.	
Jensen, Julius	Den. 1-18	Eng. 13-23	9-28-26		Med.	Physiol.
		Eng. 16-22				
Johnson, Carl E.	B.S. Minn. 22	Minn. 4-25	1-18-28		Anat.	Path.
	M.B. Minn. 24					

† Designation used in directory of the American Medical Association,

\* See Rochester list,

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Johnson, Norton T.		Ill. 6-11	4-16-28	6-15-28	Anat.	
Kadesky, David	B.S. Minn. 16 M.B. Minn. 17	Minn. 4-18	10- 2-23		Ophth. and Oto.	Anat.
Kersten, Erwin H.	E.M. Minn. 20		1-19-28	3-15-28	Dermat.	
Killion, John J.	B.A. Minn. 27		6- 7-27		Bact.	Path.
King, Joseph T.	B.S. Minn. 24 M.A. Minn. 25 M.B. Minn. 25	Minn. 4-25	10-10-23	3-10-27	Physiol.	Med.
King, Zerah P.		Minn. 4-14	1- 7-27	6-15-27	Path.	
Klein, Albert D.	B.S. Minn. 27		9-30-27		Anat.	Path.
Knapp, Miland E.	B.S. Minn. 26 M.A. Minn. 28		6-20-27		Physiol.	Bact.
Krogh, Laurene E.	B.A. Minn. 20 M.A. Minn. 21		6-21-20	3-15-27	Bact.	An. Biol.
Leonard, Harold J.	D.D.S. Minn. 12 B.A. Minn. 15		6-25-23	7-15-27	Physiol. Chem.	Path.
Letman, Samuel N.	B.S. Minn. 19 M.B. Minn. 21	Minn. 4-22	9-22-26	12-30-26	Pediatrics	
Levin, Bert G.	B.S. Minn. 21 M.B. Minn. 22	Minn. 4-24	10- 1-26	3-15-27	Otology	
Levine, Naftoli M.	B.S. Minn. 24 M.B. Minn. 26	Minn. 4-27	10- 3-27		Anat.	Path.
Lincoln, Miriam	A.B. Radcliffe 22 M.S. Smith 23		9-29-25	6-15-27	Bact.	
Lohrentz, Abraham	A.B. Bethel 16 B.S. Kans. State 18	Mo. 2-20	10- 3-27		Ophth.	
Lufkin, Nathaniel H.	B.S. Minn. 24 M.B. Minn. 25	Minn. 4-27	7- 1-26		Path.	Med.

McDonald, Robert E.	B.A. Wisc. 22 B.S. Minn. 24 M.B. Minn. 25	Minn. 4-26	9-26-27		Obstet. and Gynec.	Anat.
McGregor, Leone	M.S. Minn. 27	Alta. 1-25	11-26-26		Path.	An. Biol.
McKinlay, Ruth A.	B.A. Macalester 12		10- 1-24	7-31-27	Physiol. Chem.	Org. Chem.
Macnie, John P.	A.B. Yale 21	Mass. 1-25	9-26-27	12-30-27	Ophth. and Oto.	
Maglaya, Jesus B.	B.A. St. Thomas 23		9-29-26		Prev. Med. and P.H.	Bact.
May, Geo. Elliott	A.B. Hamilton 21	Mass. 1-25	7-28-26	6-15-27	Obstet. and Gynec.	
Mead, Chas. H.	B.S. Minn. 26 M.A. Minn. 27	Minn. 4-28	9-30-26	6-15-28	Anat.	Ped.
Metzger, Harry C.		Mich. 1-24	10-24-25	6-15-26	Med.	Path.
Michael, Joseph C.	B.S. Minn. 12	Minn. 4-13	11- 1-23	6-15-26	Med.	
Milan, Maurice G.	B.A. Boston College 09	D.C. 2-13	2-15-27		Ophth. and Oto.	Anat.
Moseley, Robert F.	B.A. Alabama 26		9-30-26	3-15-27	Anat.	Physiol. Chem.
Mulder, Arthur G.	A.B. Hope 23 Ph.D. Minn. 26		10- 5-23	9- 4-26	Physiol. Chem.	Physiol.
Nelson, Nels Harvey	B.S. Minn. 22 M.B. Minn. 24	Minn. 4-25	4-27-28	6-15-28	Anat.	
O'Reilly, Bernard	B.S. St. Louis 23	Mo. 34-25	2-15-27		Ophth. and Oto.	Anat.
Paine, Helene A.	B.A. Colorado College 20		10- 1-27		Bact.	Physiol. Chem.
Palmer, Carroll E.	B.A. Hamline 24 M.B. Minn. 28	Minn. 4-28	9-25-26		Anat.	Ped.
Pederson, Arthur H.	B.S. Minn. 18 M.B. Minn. 20	Minn. 4-21	9-26-22		Path.	Anat.
Peterson, Dorothy C.	B.A. Minn. 27		1- 4-27		Bact.	An. Biol.
*Peyton, Wm. T.	B.S. Minn. 16	Minn. 4-19	10-4-19	6-15-28	Surg.	Path.
*Pfeffer, Theodore	B.S. Iowa 22	Iowa 3-26	4-17-28	6-15-28	Med.	Path.
Popovich, Theodore	B.A. Columbia 21	N.Y. 1-24	10- 4-26	6-15-27	Ped.	Physiol.
*Prout, Curtis T.	B.A. Cornell U. 21	N.Y. 20-24	9-26-27	12-30-27	Anat.	
Roe, Harold E.	B.A. Calif. 23		10- 3-24		Anat.	Path.

† Designation used in directory of the American Medical Association.

\* See Rochester list.

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Rosenberger, Henry		Iowa 3-25	9-29-26		Ophth. and Oto.	Anat. and Path.
Rowles, Emmett	B.A. Ohio 20		11- 8-20	7-31-27	Physiol.	Physiol. Chem.
	M.A. Ohio 22					
Rucker, Chas. W.	B.S. Minn. 24	Minn. 4-26	9-30-26	6-15-27	Ophth.	Anat.
Rufe, Redding H.	B.S. Penn. State 24		9-25-24	6-15-27	Physiol. Chem.	Org. Chem.
Sadler, Wm. Paul	B.A. Arkansas 16	Md. 7-21	8-10-22	6-15-26	Obstet. and Gynec.	Anat.
Salter, Reginald A.	B.A. Acadia 21	Que. 1-26	9-28-27		Ophth.	
Shapiro, Morse J.	B.S. Minn. 15	Minn. 4-17	9-27-26	7-31-27	Anat.	
Sherwood, Kenneth K.	B.S. Minn. 23	Minn. 4-26	4- 2-24	12-30-26	Med.	
	B.M. Minn. 25					
Shiels, Margaret A.	B.A. Macalester 24		9-24-26		Anat.	Physiol.
	M.A. Minn. 28					
Sichel, Martin S.	B.A. Columbia 21	N.Y. 1-24	10- 1-26	6-15-27	Anat.	
*Siemsen, Walter J.		Iowa 3-22	1- 1-28		Obst. and Gynec.	
Smith, Vernon D. E.	B.A. Minn. 27		9-23-27		Anat.	Path.
	M.A. Minn. 28					
Somerfield, Harry A.	B.A. Stanford 21	Calif. 11-25	6-13-25	6-15-28	Obst. and Gynec.	Anat.
	Ph.D. Minn. 28					
*Spooner, C. Martin		Man. 1-25	7- 6-28	1- 1-27	Anat.	Physiol.
Steggerda, Frederick	B.A. Hope 25		9-26-25		Physiol.	Physiol. Chem.
	M.A. Minn. 27					
Stewart, Nelson W.	B.S. Minn. 24	Minn. 4-27	9-27-27	6-15-28	Anat.	
	M.B. Minn. 26					
Stewart, Rollo I.	A.B. Minn. 17	Minn. 4-19	1- 5-26	6-15-28	Anat.	
	M.B. Minn. 19					
Stoesser, Albert V.	B.S. Minn. 22	Minn. 4-25	7- 6-25		Ped.	Physiol.
	M.B. Minn. 24					
Stryker, Wm. Byrd	B.S. Minn. 25	Minn. 4-27	1- 7-27	6-15-27	Path.	Anat.
	M.B. Minn. 26					

Urner, John A.	B.S. Wash. 22 M.B. Minn. 23	Minn. 4-24	1- 4-26		Obst. and Gynec.	Anat.
Walter, Otto T.	B.A. Iowa 16 M.S. Iowa 17 Ph.D. Iowa 23		3-24-28	6-15-28	Anat.	Bact.
Watson, Cecil J.	B.S. Minn. 23 M.B. Minn. 25 M.S. Minn. 25 Ph.D. Minn. 28	Minn. 4-26	11-11-25	6-15-28	Path.	Med.
Williams, Bernice	B.A. Minn. 26		1-6-28		Bact.	
Williamson, Geo. A.	B.A. G. Wash. 17	D.C. 2-21	9-29-24	12-13-27	Surg.	Path.
Winer, Louie H.	B.S. Minn. 24 M.B. Minn. 25	Minn. 4-26	10- 8-27		Derm.	Path.
Wold, Alvin P.	B.S. Minn. 21	Minn. 4-24	1-15-27	6-15-27	Ophth.	Anat.
Worman, Harold G.	M.B. Minn. 23 D.D.S. Minn. 25		12-14-26		Path.	Bact.
Wright, Harold N. G.	B.S. Saskatchewan 25 M.S. Saskatchewan 26		9-28-26		Pharm.	Physio
Ylvisaker, Ragnavold	B.A. Minn. 20 B.S. Minn. 23 M.B. Minn. 26	Minn. 4-27	10- 3-27		Med.	Path.
Ziegler, Lloyd H.	B.A. Indiana 16 M.A. Indiana 16	Minn. 4-21	9- 1-24	6-15-28	Bact.	

† Designation used in directory of the American Medical Association.

\* See Rochester list.

GRADUATE STUDENTS REGISTERED AT THE MAYO FOUNDATION FROM  
JULY 1, 1926, TO JUNE 30, 1928

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Abbott, Walter Dayton	B.S. Creighton 26	Neb. 6-26	10- 1-27		Surg.	Path.
Adams, Samuel Franklin	M.S. Med. Minn. G. 1-27	N.Y. 9-20	10- 1-21	1- 1-28	Med.	Path.
Adler, Stuart Welch	Ph.B. Lafayette 15	Mass. 1-19	4- 1-28		Ped.	
Aldrich, Martha	B.A. Smith 19 M.S. Minn. G. 1-27		10- 1-25	1- 1-28	Physiol. Chem.	Physiol.
Allan, Frank Nathaniel	B.S. Toronto 24	Ont. 1-22	10- 1-25		Med.	Physiol. Chem.
Allen, Edgar Vannice	B.S. Neb. 22 M.A. Neb. 25	Neb. 5-25	7- 1-25		Med.	Path.
Anderson, Allan Ramseur	A.B. Trinity 15 A.M. Trinity 16	Pa. 1-23	10- 1-24	10- 1-27	Med.	Path.
Anderson, Edward Waldemar		Iowa 3-23	1- 1-25		Med.	Path.
Anderson, Gilbert Christian	B.A. Union 05 M.S. Surg. Minn. G. 1-27	N.Y. 1-17	4-24-24	7- 1-27	Surg.	Path.
Anderson, Mark John	B.S. Minn. 23	Minn. 4-25	7- 1-25		Surg.	Path.
Anderson, Reuben Mauritz	B.A. Macalester 22 B.S. Minn. 23	Minn. 4-25	1- 1-28		Surg.	Path.
Anderson, Richard Speight		Md. 1-24	1- 1-28		Surg.	Path.
Ash, Wilford Anthony	B.S. Creighton 23	Neb. 6-23	7- 1-24	10- 1-27	Med.	Path.
Aurelius, John Richard	B.S. Minn. 20	Minn. 4-23	4- 1-25	7- 1-27	Radiol.	Path.
Bain, Charles Grant		N.S. 1-19	4- 1-27		Surg.	Path.
Bannick, Edwin George	B.S. U. of Iowa 16	Iowa 3-23	1- 1-25		Med.	Path.
Barborka, Clifford Joseph	B.S. U. of Chicago 16	Ill. 1-20	10- 1-21		Med.	Path.
Bargen, Jacob Arnold	B.S. U. of Chicago 16	Ill. 1-21	10- 1-25		Med.	Bact.
Barker, Nelson Waite	B.A. Dartmouth 21	Ill. 1-24	1- 1-26		Med.	Path.
Barnes, Arlie Ray	A.B. Indiana U. 15 A.M. Indiana U. 16	Ind. 20-19	7- 1-20		Med.	Path.



Barrow, Ethel		Eng. 6-25	10- 1-27		Path.	Bact.
Bassel, Paul Maiden	A.B. U. of Texas 22	Texas 2-24	10- 1-25	1- 1-28	Med.	Path.
Baumgartner, Conrad John	B.S. U. of Neb. 21	Neb. 5-23	1- 1-25		Surg.	Path.
Baxter, Geoffrey Haslam		Calif. 2-24	7- 1-26	1- 1-28	Neur.	Anat.
Bayard, Harry Frederick	B.S. Minn. 21	Minn. 4-22	1- 1-28		Proct.	Path.
Bayha, Carl Homer	B.S. Ohio State 23	Ohio 40-25	7- 1-26		Med.	Path.
Beach, Watson	B.A. City of Detroit 24	Mich. 7-24	10- 1-24		Surg.	Path.
Beaver, Meredith Grable	B.A. Ore. 23	Ore. 2-26	10- 1-27		Surg.	Path.
Bergen, Ralph David	A.B. Cath. U. of Am. 17	Md. 7-21	7- 1-22	7- 1-27	Surg.	Path.
Berkman, John Mayo		Ia. 3-26	7- 1-27		Med.	Path.
Binger, Melvin William	B.A. Doane 21	Neb. 5-26	7- 1-26		Med.	Physiol.
	B.S. Neb. 23					
	M.A. Neb. 24					
Birkeland, Ivar Wessel	B.A. Kristiania 16	Norway 1-24	10- 1-27		Med.	Path.
Blackford, Launcelot Minor	B.S. U. of Va. 21	Va 1-23	10- 1-24		Med.	Path.
	M.S. Med. Minn. G. 1-27					
Bliss, John Herbert	A.B. Syracuse 17	N.Y. 1-22	10- 1-23		Surg.	Path.
	B.S. Columbia 20					
Bliss, Theodore Liston	B.S. Kenyon 22	Mich. 1-26	1- 1-28		Med.	Path.
Bloomer, Joseph Arnold		Man. 1-25	1- 1-26	Apr., '28	Med.	Path.
Podine, Marc Williams		Pa. 1-24	7- 1-25		Med.	Path.
Boeck, William Charles	B.S. Carleton 15	Mass. 1-26	10- 1-26		Med.	Bact.
	M.A. Calif. 16					
	Ph.D. Calif. 18					
Boesel, Reuben Jacob	B.A. Ohio State 18	Ohio 40-21	10- 1-27		Surg.	Path.
Bonesteel, Henry Theodore Samuel	B.S. Neb. 24	Colo. 2-26	1- 1-28		Surg.	Path.
Boothby, Gertrude	B.A. Milwaukee-Downer		10- 1-27		Physiol. Chem.	Physiol.
Borgeson, Egbert John	B.S. Minn. 17	Minn. 4-19	7- 1-25	4- 1-27	Ophth.	Anat.
	M.S. Ophth. Minn. G. 1-27					
Bowles, John Herschel	B.S. Wis. 22	Ill. 1-24	4- 1-25		Surg.	Path.
Brading, Edward Thurston	Ph.B. Tusculum 18	Mass. 1-23	8- 1-24	7- 1-27	Med.	Path.

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Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Bratrude, Earl Jeffrey	B.S. Minn. 19	Minn. 4-22	4- 1-26		Surg.	Path.
*Brockbank, Thomas William	A.B. St. Bonaventure 15 A.M. Cath. U. Ph.D.-18	D.C. 2-24	7- 1-25		Neurol.	Path.
Brown, Alex Edward	B.S. Minn. 19	Minn. 4-22	5-15-25		Med.	Path.
Brown, Clarence Baxter	B.S. Wis. 22	Ill. 1-25	10- 1-26		Surg.	Path.
Brown, Felix Manning	A.B. Vanderbilt 20	Tenn. 5-24	7- 1-25	Mar., '28	Med.	Path.
Brown, Philip Walling	B.A. Colo. 17	Pa. 1-20	9- 1-21		Med.	Path.
Bruner, Julian Minassian	B.S. Chicago 22	Ill. 1-26	10- 1-27		Surg.	Path.
Brunsting, Louis Albert		Mich. 1-24	4- 1-26		Dermat.	Path.
Bueermann, Winfred Henry	B.S. McMinnville 17 Ph.D. Surg. Minn. G. 1-27	N.Y. 1-21	10- 1-22	4- 1-27	Surg.	Path.
Bumpus, Laurin Dudley	Ph.B. Brown 22	Mass. 1-26	10- 1-27		Med.	Path.
Bunten, William Andrew	B.S. Neb. 22	Neb. 5-22	4- 1-27		Surg.	Anat.
Burns, Arthur	B.A. Texas 19	Md. 7-22	7- 1-24	10- 1-26	Med.	Path.
Carmichael, Hugh Thompson		Ont. 5-23	10- 1-27		Med.	Physiol.
Cave, Harry Allen	B.S. Western Ont. 22	Ont. 6-25	10- 1-26		Med.	Path.
Caylor, Harold Delos	B.S. U. of Chicago 18 M.S. Path. Minn. G. 1-27	Ill. 1-18	7- 1-21		Path.	Ex. Surg.
Childrey, John Howard		Va. 4-26	10- 1-27		Med.	Path.
Christensen, Eli Elisman		Ia. 3-26	7- 1-27		Surg.	Path.
Chumley, Charles Lawrence	B.S. Tenn. 23	Tenn. 6-24	7- 1-25		Surg.	Path.
Clawson, Thomas Alfred	B.A. Utah 22	Md. 1-24	10- 1-27		Med.	Physiol.
Clifton, Charles Egolf	B.A. Ohio State 25 M.S. Ohio State 26		10- 1-27		Biophysics	Chem.
Close, Katherine Margaret		Calif. 6-14	1- 1-27	1-1-28	Med.	
Coakley, Leo Patrick	B.S. Creighton 24	Neb. 6-26	7- 1-27		Oto-Laryng.	Path.
Coffey, Jay Russell	B.S. Ore. Agr. Col. 16	Ore. 2-23	7- 1-24	7- 1-27	Surg.	Path.
Coleman, Julian Harwood		Va. 1-25	10- 1-26 1- 1-28	1- 1-27 }	Surg.	Path.

Collins, Harry Aloysius		Neb. 6-22	7- 1-23	10- 1-26	Med.	Path.
Comfort, Mandred Whitset	A.B. Austin 16	Texas 2-21	7- 1-23	1- 1-27	Neurol.	Path.
	M.S. Neur. Minn. G. 1-26					
Constam, George Richard Martin		Switz. 7-24	10- 1-25		Med.	Physiol.
Constans, George Maurice	B.A. Carleton 12	Minn. 4-17	10- 1-24	10- 1-26	Ophth.	Anat.
Cooke, Hamilton	B.S. Minn. 22	Minn. 4-24	4- 1-27		Surg.	Path.
Cooper, Finis Gaston	B.A. Maryville 18	Ill. 1-25	4- 1-27		Surg.	Path.
Corbelle, Catherine	A.B. Coll. of City of Detroit 25	Mich. 7-26	7- 1-26		Biophysics	Anat.
Counsellor, Virgil Sheets	B.S. Chicago 18	Ill. 1-20	1- 1-24	1- 1-28	Surg.	Path.
	M.S. Surg. Minn. G. 1-27					
Craig, Winchell McKendree	B.A. Ohio Wesleyan	Md. 7-19	7- 1-21		Surg.	Path.
Crane, Jacob Frederick		Ga. 5-22	1- 1-27		Obst.	Path.
Crane, William Whitfield	B.A. Stanford 17	Calif. 11-22	7- 1-23	4- 1-27	Surg.	Path.
Crisp, Norman William	B.S. Dartmouth 21	Vt. 2-25	1- 1-27		Surg.	Path.
Daniels, Harry Anthony	B.S. Minn. 18	Minn. 4-21	4- 1-27		Med.	Path.
Davenport, LaMar Hay	A.B. Swarthmore 22	Pa. 1-26	4- 1-28		Med.	Path.
Davis, George Earl	A.B. Ind. 14		7- 1-27		Biophysics	
	M.S. Ia. State 22					
Davis, John Dwight	A.B. Neb. 18	Ill. 11-22	7- 1-26		Med.	Path.
Davison, Hugh Loyd		Pa. 1-24	1- 1-28		Surg.	Path.
Dawley, Walter Averill	B.S. S. D. 23	Ill. 11-25	10- 1-26		Surg.	Path.
Dean, Benjamin Franklin	B.A. Geo. Wash. 26	D.C. 1-23	10- 1-26		Surg.	Path.
*de Carle, Donald Wilson	B.S. Minn. 20	Minn. 4-24	9-29-20		Obst.	Anat.
Decker, Walter Joseph	B.S. Penn. State 18	Mo. 2-23	10- 1-24		Oto-Laryng.	Path.
	M.S. St. Johns 23					
Desloges, Alfred	B.S. Montreal 16	Que. 2-23	10- 1-25	8-15-27	Ophth.	Path.
Ditmore, David Claude	B.S. Minn. 24	Minn. 4-26	4- 1-27		Surg.	Path.
Dixon, Claude Frank	B.S. Kansas 19	Kans. 2-21	10- 1-22		Surg.	Path.
	M.S. Surg. Minn. G. 1-26					
Dixon, Robert Kenneth	B.S. Minn. 20	Minn. 4-23	10- 1-23		Med.	Path.

† Designation used in directory of the American Medical Association.

\* See Minneapolis list.

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Dobson, Herbert Victor	B.A. Toronto 16 M.S. Med. Minn. G. 1-27	Ont. 1-19	10- 1-23	7- 1-27	Med.	Path.
Donald, Joseph Marion	B.S. Ala. 23	La. 1-25	1- 1-28		Surg.	Path.
Dorman, Henry Pickett	B.S. Ga. 22 M.S. Ill. 24		9- 9-26	8-16-27	Anat.	
Dorsey, Anna H. E.	B.S. Md. 25 M.S. Md. 26		1- 1-27		Bact.	
Dowler, Vernon Booth	B.A. Toronto 15 M.S. McGill 16	Ont. 1-19	4- 1-26		Ped.	Path.
Down, Howard Ivan	B.A. Morningside 21	Ill. 11-25	10- 1-27		Surg.	Path.
Drips, Della Gay	B.A. Wis. 08 M.S. Minn. 17	Minn. 4-21	10- 1-21	4- 1-28	Med.	Path.
Dunlap, Harold Foster	B.S. Indiana 18	Ind. 20-20	1- 1-22		Med.	Path.
Emmons, William Frank	B.A. British Columbia 18 M.S. McGill 20	Que. 1-24	10- 1-27		Surg.	Path.
Eskew, Don Carlos		Va. 1-24	7- 1-25	10- 1-27	Surg.	Path.
Etheredge, Shuler Hardin		S.C. 1-24	7- 1-25		Med.	Path.
Eubanks, George Foster (Junior)		Ga. 5-25	7- 1-26		Surg.	Path.
Fallon, John Michael	B.A. Holy Cross 19	Mass. 1-23	1- 1-27		Surg.	Path.
Fasting, George Frederick Christoffer	B.S. La. State 13	Ill. 1-26	10- 1-27		Bact.	
Faust, Louis Sanders	B.S. Northwestern 22	Ill. 6-22	7- 1-23		Med.	Path.
Fauster, John Ulrich (Junior)	B.A. Defiance 23	Mich. 1-26	10- 1-27		Med.	Path.
Fehland, Harold Roland	B.S. U. of Wis. 22	Minn. 4-25	4- 1-26		Surg.	Path.
Ferguson, James Vance	B.S. Ark. 21	La. 1-23	{ 4- 1-25 7- 1-26	{ 10- 1-25 1- 1-27 }	Surg.	Path.
Figi, Fred Adam		Neb. 5-18	7- 1-18		Oto-Laryng.	Path.

Finney, William Parker (Junior)	A.B. Princeton 08	Md. 7-12	11- 1-19	10- 1-26	Med.	Path.
Fishback, Frederick Coleman	A.B. Harvard 19	Mass. 1-22	7- 1-25		Surg.	Path.
Fitts, William Thomas	B.S. Nat'l Teachers Normal, Tenn. 09	Tenn. 5-13	10- 1-25	10- 1-27	Med.	Path.
*Fitz Gibbon, Thomas Grattan	B.S. Creighton 22	Neb. 6-24	10- 1-26		Surg.	Path.
Flothow, Paul George	B.S. Neb. 21	Pa. 1-23	7- 1-24	7- 1-27	Surg.	Path.
Ford, Frances Adelia	M.S. Surg. Minn. G. 1-27 B.S. Minn. 14	Minn. 4-21	1- 1-22		Med.	Radiol.
Fortin, Harry John	M.S. Med. Minn. G. 1-27 A.B. Fargo Col. 12	Ill. 6-16	8- 1-25		Ortho. Surg.	Path.
Foster, Wilmot Coyne	B.A. Ore. 16 M.A. Ore. 23	Ore. 2-20	4- 1-27		Surg.	Path.
Fowler, Louis McCargo		Pa. 1-24	7- 1-26		Surg.	Path.
Fox, Ben	B.S. Wash. U. 23	Mo. 2-25	7- 1-26		Surg.	Path.
Frater, Kenneth	B.A. Capetown 19	U. of Capetown 23	10- 1-25		Urol.	Path.
Fredrickson, Clyde Harold	B.S. Minn. 22	Minn. 4-24	7- 1-26		Surg.	Path.
Fulcher, Oscar Hugh	B.S. William and Mary 22	Va. 1-26	4- 1-28		Surg.	Path.
Gallagher, Bernard James	B.S. Minn. 14	Minn. 4-16	5- 1-19 4- 1-27 10-15-24	4- 1-21 10- 1-27 1- 1-28	Surg.	Path.
Gay, James Gaston	B.A. U. of Ga. 19 M.S. Surg. Minn. G. 1-27	Md. 7-23			Surg.	Path.
Gayden, Lewis Ruben		Tenn. 5-25	10- 1-26	10- 1-27	Surg.	Path.
Gearey, Verne Smith	B.S. Minn. 19	Minn. 4-21	1- 1-27	3-14-28	Derm.	Path.
Ghrist, David Garrison	B.A. Stanford 21	Mass. 1-25	4- 1-27		Med.	Path.
Gillies, Alexander		Scot. 3-23	2-10-27		Ortho. Surg.	Anat.
Gilshannon, Bernard Justin		Neb. 6-21	4- 1-28		Med.	Path.
Gleason, Notery Arthur		Mich. 7-25	7- 1-26		Derm.	Path.
Good, Louis Porter	B.S. Davidson 20 M.A. Davidson 20	Md. 7-24	10- 1-26		Surg.	Path.

† Designation used in directory of the American Medical Association.

\* See Minneapolis list.

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Good, Ralph William	B.S. Cincinnati 22	Ohio 41-24	7- 1-26		Surg.	Path.
Gorder, Arne Christian	B.S. Wis. 20, M.S. 21	Ill. 1-24	10- 1-24		Surg.	Path.
Graham, Andrew Stephens		Va. 1-25	7-1-26		Surg.	Path.
Grain, Gerald Orton	B.A. Manitoba 12	Man. 1-16	1- 1-26	10- 1-27	Neurol.	
Greeley, Horace (Junior)	R.S. Brooklyn Polytech. 20 Ch.E. Brooklyn Polytech. 21	N.Y. 20-27	4- 1-28		Surg.	Path.
Green, George Francis	B.S. Mich. 22	Mich. 1-24	10- 1-25		Surg.	Path.
Greene, Earle Ira	B.S. Chicago 20 M.S. Surg. Minn. G. 1-27	Ill. 1-22	4- 1-24		Surg.	Path.
Greenlee, Daniel Paul	B.S. Pittsburgh 22	Pa. 12-24	7-15-25		Surg.	Path.
Grier, James Parkes	B.S. Northwestern 24	Ill. 6-25	1- 1-26		Surg.	Path.
Guastavino, Carlos		Spain 8-22	5- 1-27	3- 1-28	Obst.	
Hager, Benjamin Harry	B.S. Chicago 15	Ill. 1-17	11- 1-22	4- 1-28	Urol.	Path.
Haines, Samuel Faitoute	S.B. Harvard 15	Mass. 1-19	7- 1-21		Med.	Path.
Haldeman, Keene Oliver	A.B. Calif. 20 M.A. Calif. 24	Calif. 2-25	7- 1-26		Ortho. Surg.	Path.
Hamrick, Robert Arnold	B.S. Ala. 19	Md. 7-23	1- 1-25		Surg.	Path.
Hand, John Redmond	B.S. Minn. 20	Minn. 4-24	1- 1-25		Urol.	Path.
Hane, Richard Lincoln	B.S. Ohio State 22	Ohio 40-24	1- 1-26		Surg.	Path.
Hanlon, Frank Robert		Pa. 2-25	7- 1-26		Surg.	Path.
Hargis, Estes Henry	M.S. Surg. Minn. G. 1-26	Pa. 1-21	7- 1-23	1- 1-27	Surg.	Path.
Harrington, Ethel R.	Ph.B. Chicago 12	Ill. 1-17	1- 1-24	10- 1-26	Ped.	Path.
Harshbarger, Isaac Long		Va. 1-22	7- 1-24	7- 1-27	Surg.	Path.
Hartwell, Shattuck Wellman	B.S. Minn. 23	Minn. 4-26	10- 1-26		Surg.	Path.
Hartzell, John B.		Ohio 41-25	7- 1-26		Surg.	Path.
Hauscr, Emil Daniel	B.S. Minn. 19 M.S. Ortho. Surg. Minn. G. 1-27	Minn. 4-22		9- 1-25 } 10- 1-26 }	Ortho. Surg.	Neur.
Havens, Fred Z.	B.S. Drake 12	Ill. 1-15	4- 1-26		Oto-Laryng.	Path.

Hazeltine, Matthew Emery	B.S. Calif. U. 16 B.A. Stanford 22	Calif. 11-25	1- 1-26		Surg.	Path.
Heck, Frank Joseph	B.S. Minn. 19 M.S. Minn. 25	Minn. 4-26	10- 1-26		Med.	Path.
Heetderks, Dewey Ralph	A.B. Mich. 18 M.S. Oto-Laryng. Minn. G. 1-27	Mich. 1-22	1- 1-23	7- 1-27	Oto-Laryng.	Path.
Hefke, Hans Wilhelm		Germ. 21-23	4- 1-28		Path.	
Heimdal, Clarence Oliver	B.S. Wis. 23	Ill. 1-25	4- 1-27		Surg.	Path.
Hench, Philip Showalter	A.B. Lafayette 16	Pa. 12-20	10- 1-21		Med.	Physiol. Chem.
Henderson, Earl Fletcher	B.S. Grove City 13 M.S. Surg. Minn. G. 1-27	Pa. 1-18	1- 1-24	7- 1-27	Surg.	Path.
Herrick, Julia Francis	B.A. Minn. 15 M.A. Minn. 19		10- 1-27		Biophysics	
Herrmann, Siegfried Frederick	B.S. Hamline 15	Minn. 4-20	4- 1-26		Surg.	Path.
Hill, Frederick Charles	B.A. N. Dakota 21	N.Y. 1-25	10- 1-27		Surg.	Path.
Holland, Wilbur Wallis		Pa. 1-25	4- 1-27		Surg.	Path.
Honan, Martin Stanislaus	B.A. U. of Dublin 18 M.A. U. of Dublin 24	Ire. 3-24	10- 1-25	1- 1-28	Med.	Path.
Hookey, John Arlington		Mich. 1-24	10- 1-27		Derm.	Path.
Horton, Bayard Taylor	B.S. Va. 21	Va. 1-22	7- 1-25		Med.	Path.
Horwitz, Alec	B.A. Geo. Wash. 20 M.S. Surg. Minn. G. 1-27	D.C. 1-23	7- 1-24		Surg.	Path.
Huffman, Lester Dale	B.S. Indiana 14	Ind. 2-16	4- 1-23		Med.	Path.
Hufford, Alvin Ray	M.S. (Phys.) Loyola 23	Ill. 43-22	1- 1-24	4- 1-27	Med.	Physiol.
Humiston, Homer Wheeler	B.S. Ill. 23	Ill. 11-25	11-10-26		Surg.	Path.
Hunt, Henry Franklin		Tenn. 5-24	7- 1-26		Path.	Bact.
Hurley, Michael Vincent	B.A. U. of Cork 14	U. of Cork 19	10- 1-25	8- 1-27	Surg.	Path.
Hurt, Algernon Smith (Junior)		Va. 1-26	10- 1-27		Ped.	Path.
Iler, Russell Hills	A.B. Cornell 20	N.Y. 20-24	7- 1-25	10- 1-26	Ped.	Path.
Jacobs, Minard Fredberg	B.S. Mich. 19	Mich. 1-23	7- 1-25		Med.	Path.
Jepson, Paul Newton	B.A. Carleton 16 M.S. Ortho. Surg. Minn. G. 1-26	Pa. 1-20	9- 1-21	1- 1-27	Orth. Surg.	Path.

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Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Johnson, Ada Frances	A.B. Bryn Mawr 17 M.A. Minn. 18 Ph.D. Minn. 21		5- 1-27	10- 1-27	Biophysics	
Johnson, Arthur Charles	B.S. Minn. 18	Minn. 4-20	1- 1-20	10- 1-26	Surg.	Path.
Johnson, Henry Peter	B.S. Bates Col. 16	Maine 1-21	4- 1-24	1- 1-27	Oto-Laryng.	Path.
Johnson, Walter Royle	B.S. Minn. 22	Minn. 4-25	4- 1-26		Med.	Path.
Jones, Robert DuVal (Junior)	A.B. N.C. 20	Pa. 1-24	7- 1-25		Surg.	Path.
Jones, Thomas Meredith		Que. 1-24	1- 1-27	7- 1-27	Surg.	Path.
Jordan, Elverse Morris		Texas 2-23	7- 1-25		Med.	Path.
Jordan, Ferdinand Michael		Pa. 1-25	7- 1-26		Med.	Path.
Kellum, Eugene LeRoy		Pa. 1-24	7- 1-26		Surg.	Path.
Kennedy, Roger L. J.	B.S. Minn. 18	Minn. 4-22	7- 1-23		Ped.	Path.
Kepler, Edwin John	B.S. Pa. State 16	Minn. 4-25	10- 1-25		Med.	Path.
Kepler, Helen Mackeen	B.S. Minn. 18	Minn. 4-22	10- 1-25		Ped.	Path.
Kernohan, James Watson	B.S. Queens 21 M.A. Minn. 24	Ire. 1-21	10- 1-22		Path.	Bact.
Kestel, John L.	B.S. Creighton 22	Neb. 6-24	4- 1-26	Apr., '28	Med.	Path.
Kilgore, George Lester	B.S. Emory 24	Ga. 5-26	10- 1-27		Path.	
Killins, Wendall Allensworth		Neb. 5-21	9- 1-23	2- 5-27	Med.	Path.
Kintner, Arthur Ruel	B.S. Neb. 25	Neb. 5-25	1- 1-28		Med.	Path.
Kirch, Walter A.		Italy 6-24	1- 1-27		Surg.	Path.
Kleinheksel, John Lewis	A.B. Mich. 20	Mich. 1-24	7- 1-25		Med.	Path.
Knight, Mary S.	B.S. Chicago 18	Ohio 41-20	{ 7- 1-22 1- 1-28	{ 4- 1-25 4- 1-28 }	Opath.	Path.
Korth, Zeno Nicholas	A.B. St. Mary's 21	Neb. 6-25	7- 1-26	10- 1-27	Med.	Path.
Koster, Basil McDonald		Que. 1-22	7- 1-24	1- 1-28	Surg.	Path.
Lacy, Nicholas Eugene		Mich. 1-26	7- 1-27		Oto-Laryng.	Path.
Lansbury, John		Ont. 5-26	10- 1-27	11-25-27	Med.	Path.
Lapp, Victor Roy		Que. 1-21	8-16-23	4- 1-27	Oto-Laryng.	Path.



Lara, y Baldoria Casimiro		P. I. 2-19	8-22-24	8- 1-26	Med.	Physiol.
Larson, Lawrence Myrlyn	B.S. Minn. 25	Minn. 4-27	4- 1-28		Surg.	Path.
Larson, Nora Leona	B.A. St. Olaf 23		10- 1-27		Bact.	
Latchford, James Kyran	B.A. Toronto 14	Ont. 1-21	10- 1-22	7- 1-27	Surg.	Path.
Lindsey, Maude Louise	A.B. Colo. 23	Mo. 2-24	7- 1-25	11-15-27	Ped.	Path.
Linesberry, Ellis Dice		Va. 1-26	10- 1-27		Med.	Path.
Loewen, David Frank	B.A. Carleton 26		4- 1-26		Physiol. Chem.	
Loughery, Harold Barker	B.S. Ill. 19	Ill. 11-22	10- 1-27		Surg.	Path.
Lovely, James Philip	B.S. Creighton 21	Neb. 6-23	1- 1-27		Path.	
McBride, William Percy Leon	B.A. Wake Forest 24	Va. 4-26	10- 1-27		Surg.	Path.
McCann, James Cole	B.A. Georgetown 20	Mass. 1-24	10- 1-26		Surg.	Path.
McCarty, Ray Bardwell	B.A. Calif. 21	Pa. 1-25	10- 1-27		Surg.	Path.
McCaughan, John Milton	B.S. Wash. U. 24	Mo. 2-26	1- 1-28		Surg.	Path.
McIndoe, Archibald H.	M.S. Path. Minn. G. 1-27	U. of Otago 23	1- 1-25		Surg.	Path.
McKeithen, Archibald M.	B.S. Davidson 16	Md. 7-20	10- 1-24	Apr., '28	Surg.	Path.
McKnight, Roy Bowman	A.B. N.C. 14	Pa. 1-20	7- 1-24	1- 1-27	Surg.	Path.
McNaugher, Wm. McMillan	B.S. Westminster 17	Pa. 1-24	7-15-25		Surg.	Path.
McQuiggan, Mark Ronald	B.S. Pittsburgh 21	Pa. 12-23	7- 1-24		Med.	Path.
MacKay, Roland Parks	B.A. Emory 20	Ont. 1-25	10- 1-26		Neurol.	Physiol.
Magee, Henry Ross	B.A. Manitoba 18	Man. 1-23	{ 7- 1-24	{ 12- 1-24 }	Med.	Path.
			{ 7- 1-27			
Magrath, William Atkinson		Man. 1-16	4- 1-27		Ophth.	
Sadler		Pa. 1-25	7- 1-26		Surg.	Path.
Mahorner, Howard Raymond	A.B. Spring Hill 21	Minn. 4-27	4- 1-27		Proct.	Path.
Malmgren, George Erland	B.S. Minn. 24	Ont. 1-24	7- 1-25		Surg.	Path.
Maloney, Frank Geo. Hiram		Pa. 12-25	4- 1-27		Med.	Path.
Margolis, Harry Maurice	B.S. Pittsburgh 25	Ont. 1-23	10- 1-27		Physiol.	
Markowitz, Jacob	Ph.D. Toronto 26	Pa. 1-25	4- 1-27		Surg.	Path.
Marshall, James Max	B.A. Utah 22	Neb. 6-16	{ 1- 1-18	{ 1-29-20 }	Surg.	Path.
Martin, Clement Leon	B.A. Creighton 11		{ 10- 1-26	{ 7- 1-27 }		

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Masson, Duncan Morrison	B.A. Toronto 18	Ont. 1-20	7- 1-21		Med.	Path.
Mattson, Hamline Augustus	B.A. Augustana 19	Minn. 4-26	4- 1-27		Surg.	Path.
	B.S. Minn. 24					
May, James Alan	B.S. Minn. 23	Minn. 4-26	7- 1-26		Urol.	Path.
Mayfield, Alfred Lisle	B.S. Wis. 15	Ill. 1-17	1- 1-23	10- 1-26	Surg.	Path.
	M.S. Surg. Minn. G. 1-26					
Mayo, Charles William	A.B. Princeton 21	Pa. 1-26	8- 1-27		Surg.	Path.
Maytum, Charles Koran		Iowa 3-19	7- 1-22		Med.	Bact.
Metheny, David	B.A. Pa. 20	Pa. 2-23	4- 1-27		Surg.	Path.
Miller, Charles Duane	B.S. Ohio State 19	Ohio 40-21	10- 1-26		Surg.	Path.
Mitchell, John		Scot. 1-09	4- 1-28		Urol.	
Moersch, Frederick Paul	B.S. Minn. 11	Minn. 4-13	7- 1-20		Neurol.	Path.
Mohardt, John Henry	B.S. Notre Dame 22	Ill. 6-27	4- 1-28		Surg.	Path.
Montgomery, Hamilton	A.B. Harvard 18	Mass. 1-22	1- 1-25	1- 1-28	Derm.	Path.
	M.S. Dermat. Minn. G. 1-27					
Moore, Claude		Va. 1-16	4- 1-28		Radiol.	Path.
Moore, Thomas Benjamin	B.S. Minn. 22	Minn. 4-24	10- 1-27		Surg.	Path.
Morton, Charles Bruce	B.S. Va. 20	Va. 1-22	9- 1-24	10- 1-27	Surg.	Path.
Morton, Herschel Burdette	B.S. Neb. 23	Neb. 5-25	4- 1-28		Surg.	Path.
Morton, Silvanus Archibald	B.A. Dalhousie 22	N.S. 1-26	10- 1-27		Surg.	Path.
Mount, Harry Telford Roy		Toronto 1-24	4- 1-27		Surg.	Path.
Moxon, Frank Macquarie	B.A. Maryville 15	Wis. 6-19	4- 1-26	3- 1-27	Surg.	
	B.S. Marquette 19					
	M.S. Geo. Wash. 16					
Mroz, Rudolph John	B.S. Ill. 19	Ill. 11-22	10- 1-27		Ortho. Surg.	Path.
Mulholland, Stanford Wallace		Mich. 1-25	10- 1-27		Surg.	Path.
Murphy, George Thomas	B.A. Ill. 20	Ill. 1-24	10- 1-27		Surg.	Path.
Murray, James Kenneth P.		Ont. 1-21	1- 1-26		Surg.	Path.
Nabers, Luke Waldrep	B.S. Ala. 22	Ohio 41-24	4- 1-28		Surg.	Path.

Nagel, Gunther Wilibald	A.B. Stanford 17 M.S. Surg. Minn. G. 1-26	Calif. 11-21	7- 1-22	4- 1-28	Surg.	Path.
Nelson, Marque Ovid	B.S. Minn. 22	Minn. 4-23	1- 1-24		Derm.	Path.
Nelson, Wallace LeRoy	B.A. Lawrence 22	Ill. 6-27	10- 1-27		Surg.	Path.
Nesbit, Mark Edwin		Pa. 1-26	10- 1-27		Opthth.	Path.
Nomland, Ruben	B.S. N. D. 22	Ill. 1-24	1- 1-26		Derm.	Path.
Normen, William Blount	B.S. N.C. 20	Pa. 2-22	5- 1-27		Surg.	Path.
Norton, Donald Martin	B.S. Marquette 25	Wis. 6-25	10- 1-26	1- 1-28	Med.	Path.
Norton, Manville William		Mich. 1-24	4- 1-26		Surg.	Path.
Nunn, Leslie Laughlin		Pa. 2-25	{ 7- 1-26	{ 2- 1-27 }		
			{ 1- 1-28		Surg.	Path.
Nutting, Roland Edward	B.S. Minn. 22	Minn. 4-25	4- 1-27		Ped.	Path.
Ochsenhirt, Norman Charles	B.S. Pittsburgh 16 M.S. Surg. Minn. G. 1-27	Pa. 12-17	7- 1-24	1- 1-28	Surg.	Path.
Ochsner, Harold Conrad	B.S. Minn. 24	Minn. 4-27	10- 1-27		Med.	Path.
Omohundro, Miles Parker		Va. 1-22	4- 1-24	10- 1-27	Urol.	Path.
Palmer, Bean Mark	B.S. Charleston 21	S. C. 1-25	10- 1- 26		Surg.	Path.
Palomeque, Emilio Jose		Pa. 1-23	10- 1-25		Surg.	Path.
Parker, James Wm. (Junior)	B.S. Ill. 19	Ill. 11-20	4- 1-22	1- 1-27	Surg.	Path.
Parker, Stephen Thomas	B.S. Gonzaga 23	Neb. 6-21	4- 1-23	9- 1-26	Derm.	Path.
Parson, George Washington		Va. 4-22	10- 1-26		Med.	Path.
Parsons, Eloise	A.B. Randolph-Macon 17	Ill. 1-24	7- 1-25	1- 1-28	Med.	Path.
Partch, Wallace Taylor	A.B. Oberlin 21	Ill. 1-26	4- 1-27		Med.	Path.
Passalacqua, Luis Antonio	B.A. Geo. Wash. 22	D.C. 1-25	10- 1-26		Surg.	Path.
Paterson, James Ralston Kennedy		Scot. 3-23	10- 1-26	10-17-27	Radiol.	Path.
Paton, Walter Mudie		Ont. 1-24	10- 1-26		Oto-Laryng.	Path.
Peacock, Henry Arthur		Que. 1-26	10- 1-27		Med.	Path.
Perez-Fontana, Velarde Pascual	B.S. Montevideo 20	Uruguay 1-20	7- 1-26	9-19-27	Surg.	Path.
Perry, Clarence Larimore	B.A. Ohio Wesleyan 21	Ohio 40-24	4- 1-26		Surg.	Path.
Peterson, Joel Asbury		Colo. 2-25	1- 1-27		Oto-Laryng.	Path.

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*Peyton, William T.	B.S. Minn. 16 M.A. Minn. 24 Ph.D. Minn. 26	Minn. 4-19	10- 4-19	1- 1-28	Surg.	
*Pfeffer, Theodore John	B.S. Iowa 24	Ia. 3-26	10- 1-27		Med.	Path.
Pope, Charles Evans	B.A. Northwestern 23	Ill. 6-24	1- 1-26		Surg.	Path.
Powelson, Harry Clay	B.S. Ohio State 22	Ohio 40-24	1- 1-28		Med.	Path.
Prescott, Manfred Ullman	B.S. U. of Ill. 20	Ill. 11-23	4- 1-28		Surg.	Path.
Prickman, Louis Elwood	B.S. Pittsburgh 21 M.S. Med. Minn. G. 1-27	Pa. 12-21	7-15-24	7- 1-27	Med.	Path.
Priestley, Joseph Biddle	B.A. Pa. 21	Pa. 1-25	10- 1-27		Surg.	Path.
Proud, Dorothy May	B.S. Western Reserve 27		4- 1-28		Home Economics	
*Prout, Curtis Tuttle	A.B. Cornell 21	N.Y. 20-24	4- 1-27		Neurol.	Neuro. Path.
Puestow, Charles Bernard	B.S. Wis. 23	Pa. 1-25	1- 1-28		Surg.	Path.
Pugliese, Francis Michael		Pa. 1-23	4- 1-25		Surg.	Path.
Quale, Victor Sigvald	B.S. Minn. 23	Minn. 4-25	7- 1-26		Surg.	Path.
Radtke, Herman Peter	B.S. Minn. 21	Minn. 4-22	10- 1-26		Ortho. Surg.	Neurol.
Randall, Lawrence Merrill		Ia. 3-21	1- 1-24		Obst.	Physiol. Chem.
Rathman, Omer Charles		Mich. 1-26	1- 1-28		Obst.	Path.
Ray, Edward Hunt	B.S. Miss. 20	La. 1-22	4- 1-27		Urol.	Path.
Reddick, Charles Edgar		Ky. 2-24	{ 1- 1-26 4- 1-28	{ 1- 1-27 }	Surg.	Path.
Reid, Winfred Lee		Ill. 6-24	7- 1-25		Surg.	Path.
Rentschler, Calvin Balthaser	B.S. Dickinson 21 M.A. Dickinson 24	Pa. 1-24	7- 1-25		Surg.	Path.
Rentschler, Edwin Balthaser	B.S. Dickinson 21 M.A. Dickinson 24	Pa. 1-24	7- 1-25		Med.	Path.
Reuter, Maurice Jerome	B.S. Marquette 23	Wis. 6-24	7- 1-27		Derm.	Path.
Rieniets, John Henry	B.S. Iowa 22	Ia. 3-24	10- 1-26		Surg.	Path.
Rivers, Andrew Baptiste		Neb. 6-17	1-15-20		Med.	Physiol. Chem.

Rogers, James Creighton Thomas	B.S. Knox 20	Ill. 1-26	1- 1-28		Surg.	Path.
Rohwer, Roland Theodore	B.S. Creighton 22	Neb. 6-24	1- 1-27	2-14-28	Med.	Path.
Rolls, Kathaleen	B.A. Vassar 25		4- 1-27	10- 1-27	Bact.	Physiol.
Rowley, James Arthur	B.S. Wis. 1-24	Mich. 1-26	1- 1-28		Path.	
Rubenstein, Myer W.		Pa. 2-23	4- 1-26		Derm.	Path.
Rucker, Charles Wilbur	B.S. Minn. 23	Minn. 4-26	4- 1-26		Ophth.	Anat.
Ruedemann, Ehrhardt		Mich. 1-26	11- 1-27		Oto-Laryng.	Path.
Ryan, John Harold	B.S. St. Louis U. 20	Mo. 34-24	4- 1-26	10- 1-27	Surg.	Path.
	B.S. Med. St. Louis 22					
Rynearson, Edward Harper	B.A. Ohio Wesleyan 22	Pa. 12-26	10- 1-27		Med.	Physiol.
Sager, William Warren	B.A. Wash. & Lee 18	D.C. 1-22	7- 1-24		Surg.	Path.
Saint, James Harold	B.S. Durham 24	Eng. 4-24	4- 1-25		Surg.	Path.
Sandiford, Kathleen	A.B. Radcliffe 19		10- 1-20		Chem. (bio)	Physiol.
Sawyer, Frances Marie	B.S. 22, M.S. 23, Wis.		7- 1-23		Physiol. Chem.	Path.
Schacht, Frederick William	B.S. Beloit 22	Md. 7-26	10- 1-27		Urol.	Path.
	M.S. Wis. 24					
Schmitt, Earl Oriol Gregor	B.A. Minn. 19	Minn. 4-23	10- 1-23	10- 1-27	Med.	Path.
	B.S. Minn. 24					Path.
Scholl, Marguerite Julia	B.A. Calif. 17	Minn. 4-27	9- 1-27		Ped.	Path.
Schulz, Irwin	B.S. Wis. 21	Wis. 6-23	7- 1-24		Med.	Path.
Scott, Douglas Edmund		Ont. 1-24	1- 1-28		Urol.	Path.
Shafter, Royce Roemer	B.S. Michigan 19	Mich. 1-23	10- 1-24		Surg.	Path.
Sherrill, Walter Paul	A.B. Cornell 22	N.Y. 20-25	7- 1-26	7- 1-27	Ped.	Path.
Shippey, Stuart Hunter		Ga. 5-23	7- 1-24	10- 1-27	Med.	Path.
Shugrue, John J.	B.A. Georgetown 15	D.C. 2-19	4- 1-25		Surg.	Path.
	B.S. Georgetown 17					
*Siemsen, Walter Johannes		Ia. 3-26	7- 1-27		Ped.	Path.
Simon, Harold Ewart	B.S. Pittsburgh 20	Pa. 12-22	10- 1-23	1- 1-28	Surg.	Path.
	M.S. Surg. Minn. G. 1-27					
Smith, Harry LeRoy		Ia. 3-16	6- 8-25		Med.	Path.

† Designation used in directory of the American Medical Association.

\* See Minneapolis list.

Name	Degrees Other Than Medical and Institutions Conferring Same	Institutions Con- ferring Medical Degrees†	Date of Beginning Graduate Work	Date of Departure	Major	Minor
Smith, Leonard Marshall	B.S. Wis. 23	Ill. 6-25	10- 1-26		Surg.	Path.
Smith, Newton Dean		N.Y. 6-23	1- 1-25		Proct.	Path.
Smith, William Marshall	B.S. Wis. 23	Ill. 6-25	10- 1-26		Med.	Path.
Snell, Albert Markley	B.S. Minn. 16 M.S. Med. Minn. G. 1-27	Minn. 4-18	10- 1-25		Med.	Physiol.
Spannuth, John Roy	B.S. Albright 21	Pa. 1-26	10- 1-27		Med.	Path.
*Spooner, Christopher Martin		Man. 1-25	7- 1-26		Urol.	Path.
Squire, Fay Huffman	A.B. Colo. 22	Ia. 3-25	7- 1-26		Radiol.	Path.
Stark, Wm. Berkley		Ont. 1-15	1- 1-22		Oto-Laryng.	Path.
Steel, Robert Stanley		Australia 3-23	7- 1-26		Med.	Path.
Stephens, Brooks Palmer	B.S. Kansas 18	Kans. 2-21	2- 1-26		Ortho. Surg.	Path.
Stephenson, Robert A.	B.A. Columbia 18	N.Y. 1-18	10- 1-25	10- 1-27	Ped.	Path.
Steward, John Alexander	B.S. Va. 21	Pa. 1-26	10- 1-27		Surg.	Path.
Stinson, John Wesley		Pa. 2-21	4- 1-23	4- 1-27	Surg.	Path.
Sundberg, Rudolph Herbert	B.S. Neb. 23	Neb. 5-25	8- 1-26	7- 1-28	Med.	Path.
Sussex, Lloyd Thomas	B.S. N. D. 23	Ill. 6-25	4- 1-27		Surg.	Path.
Swan, Theodore Strong	B.S. Geneva 16	Pa. 1-20	1- 1-22	1- 1-27	Surg.	Path.
Synhorst, Alfred Paul		Iowa 3-22	4- 1-24		Surg.	Path.
Tasche, Leslie W.	B.A. Wis. 21 M.S. Wis. 22	N.Y. 1-24	1- 1-27		Surg.	Anat.
Thomas, Lester C.		Ill. 6-25	10- 1-26		Surg.	Path.
Thompson, Fred Rush	B.S. Ill. 19	Ill. 11-20	4- 1-25		Surg.	Path.
Thompson, Gershom Joseph		Mo. 2-25	10- 1-26		Urol.	Path.
Thompson, Harold Lincoln	B.S. Iowa 19 M.S. Chicago 21	Ill. 1-23	7- 1-25		Surg.	Path.
Thompson, John William (Junior)		Mo. 2-23	7- 1-24	11- 1-27	Surg.	Path.
Thureus, Sven Ture	D.D.S. Medico-Chirurgical Inst. 26	Sweden 2-24	10- 1-26	2- 1-27	Oto-Laryng.	
Tinkess, Donald Ewing		Que. 1-25	7- 1-26		Oto-Laryng.	Path.

Troup, Ralph Leslie	B.S. Neb. 19	Neb. 5-21	10- 1-26		Radiol.	Path.
Vanzant, Frances Ralston	B.A. Rice 22	Texas 2-26	7-15-27		Med.	
Verbrugghen, Adrien		Australia 3-22	10- 1-27		Surg.	Path.
Vickery, Eugene Benton	A.B. N. Ga. Agr. 19	Md. 7-23	10- 1-25		Urol.	Path.
Viecelli, James Dominic		Colo. 2-23	7- 1-25		Derm.	Path.
Vories, Ruth Elizabeth	B.S. Simmons 15	Minn. 4-25	10-18-26	Apr., '28	Ped.	Path.
Wagener, Henry Patrick	B.S. Col. of Charleston 09	S.C. 1-13	1- 1-20		Ophth.	Anat.
Wakefield, Elmer Glenn	B.S. Ark. 21	Md. 7-25	1- 1-28		Med.	Path.
Waller, Riley Moore	A.B. U. of Mo. 18	Mo. 2-20	7- 1-23	1- 1-27	Surg.	Path.
Walters, Waltman	B.S. Dartmouth 17	Ill. 1-20	7- 1-20	10- 1-27	Surg.	Path.
	M.S. Surg. Minn. G. 1-23					
Weber, Harry Matthew		Minn. 4-26	1- 1-27		Radiol.	Path.
Wellbrock, William Louis Anton	B.S. Charleston 20	S.C. 1-20	2- 1-26		Path.	Bact.
White, James Stephenson	B.S. Emory 23	Ga. 5-25	4- 1-27	11-30-27	Ophth.	
White, John Huffman	B.A. Reed 23	Ore. 2-26	1- 1-28		Med.	Path.
White, Robert Boothe	A.B. Union U. 16	Tenn. 5-20	10- 1-25		Surg.	Path.
Whitten, Merritt Bryant	B.S. U. of Ore. 21	Ore. 2-24	7- 1-25		Med.	Path.
Wickham, Mount Cecil	B.S. Minn. 23	Minn. 4-26	4- 1-26		Urol.	Path.
Wilhelmji, Charles Martell	B.S. St. Louis 22	Mo. 7-22	10- 1-25		Med.	Path.
	M.S. St. Louis 23					
Wilkinson, Henry Fielding	B.S. Dartmouth 19	Conn. 1-21	7- 1-24	7- 1-27	Oto-Laryng.	Path.
Williams, Henry Lane (Junior)	A.B. Yale 21	Pa. 1-24	7- 1-25		Oto-Laryng.	Path.
Williams, Thomas Bertram	B.A. Stanford 21	Calif. 11-25	1- 1-26	1- 1-28	Path.	Bact.
Wilson, Margeurite Elizabeth		Ont. 1-25	10- 1-26		Path.	Bact.
Wright, William Cale	A.B. Wabash 18	Mich. 1-24	7- 1-26		Surg.	Path.
Yater, Wallace Mason	B.A. Geo. Wash. 17	D.C. 2-21	1- 1-26		Med.	Physiol.
Yesko, Stephen Aloysius		D.C. 1-22	10- 1-27		Surg.	Path.

No. in registry during biennial survey	=384
Total no. in registry June 30, 1926	=186
Total no. who left July 1, 1926 to July 1, 1928	=100
Total no. beginning work July 1, 1928	=198
Total no. in registry June 30, 1928	=284

† Designation used in directory of the American Medical Association.

\* See Minneapolis list.

# Bulletin *of the University of* Minnesota

*School of Business Administration*

*Part I*

*Announcement of Courses for the Years  
1928-1930*



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## SCHOOL OF BUSINESS ADMINISTRATION

### FACULTY

Lotus Delta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Russell Alger Stevenson, Ph.D., Dean of the School of Business Administration  
Jay L. O'Hara, Ph.D., Secretary of the School of Business Administration and Lecturer in Economics  
Roy G. Blakey, Ph.D., Professor of Economics  
Wayne E. Butterbaugh, M.S. in Business, Lecturer in Transportation  
Darrell H. Davis, Ph.D., Professor of Geography  
Ernestine Donaldson, B.A., Instructor in Secretarial Training  
Frederic B. Garver, Ph.D., Professor of Economics  
Alvin H. Hansen, Ph.D., Professor of Economics  
William L. Hart, Ph.D., Professor of Mathematics  
Richard Hartshorne, Ph.D., Assistant Professor of Geography  
Herbert Heaton, D.Litt., Professor of Economic History  
Ernest A. Heilman, Ph.D., Associate Professor of Accounting  
Budd A. Holt, M.A., Assistant Professor of Agricultural Economics  
Dorothea Kittredge, M.A., Assistant Professor of Agricultural Economics  
Arthur W. Marget, Ph.D., Associate Professor of Economics and Banking  
Bruce D. Mudgett, Ph.D., Professor of Economics and Statistics  
Walter R. Myers, Ph.D., Assistant Professor of Finance  
Harry J. Ostlund, B.A., Assistant Professor of Accounting  
Donald G. Paterson, M.A., Professor of Psychology  
H. Bruce Price, Ph.D., Professor of Agricultural Economics  
John J. Reighard, M.A., C.P.A., Assistant Professor of Accounting  
Clare L. Rotzel, B.C.S., C.P.A., Associate Professor of Accounting  
William H. Stead, Ph.D., Assistant Professor of Economics  
J. Warren Stehman, Ph.D., Professor of Finance  
Roland S. Vaile, M.A., Professor of Marketing  
Frederick C. Wagner, M.A., Associate Professor of Marketing  
Warren C. Waite, Ph.D., Associate Professor of Agricultural Economics  
Robert M. Weidenhammer, Ph.D., Assistant Professor of Economics  
Elmer J. Working, M.S., Associate Professor of Agricultural Economics  
Jeremiah S. Young, Ph.D., Professor of Political Science  
Albert G. Black, Ph.D., Instructor in Economics  
Arthur Borak, B.S., M.A., Instructor in Economics  
Chelcie C. Bosland, B.S., M.A., Instructor in Economics  
George B. Clarke, B.S., Instructor in Agricultural Economics  
Ralph H. Coggeshall, M.A., Instructor in Economics  
Lowell B. Collins, B.S.C., Instructor in Accounting  
Harold G. Fraine, Com.Eng., Instructor in Accounting  
Richard A. Graves, M.A., Instructor in Economics and Insurance

*FACULTY*

3

Margaret C. Gray, B.A., Instructor in Secretarial Training  
Arnold F. Hinrichs, B.S., Instructor in Agricultural Economics  
Richard L. Kozelka, M.A., Instructor in Economics  
Faith Leonard, B.A., B.S., Instructor in Secretarial Training  
Percy M. Lowe, M.A., Instructor in Agricultural Economics  
Ruel I. Lund, M.A., C.P.A., Instructor in Accounting  
Robert B. Westbrook, B.S., M.A., Instructor in Economics  
Nina L. Youngs, B.A., Instructor in Accounting  
Ingvald W. Alm, B.S., Assistant in Economics  
Frank T. Hady, B.A., Assistant in Economics  
Clarence C. Hostrup, B.A., Assistant in Economics  
Peter L. Slagsvold, B.S., Assistant in Economics

## GENERAL INFORMATION

### ESTABLISHMENT

The School of Business Administration was officially established by vote of the Board of Regents of the University at a meeting held on June 18, 1919. This action was taken in recognition of the need for fundamental training in business comparable to that in law, engineering, and the other professions. Some courses in business had been offered as a part of the general program in economics. It had become evident, however, that a curriculum with a professional objective was essential. The establishment of such a school had been recommended by business organizations, firms, and individuals in the state. Their advice and co-operation from the start have aided greatly in placing the school upon a high professional level.

### PURPOSE

It is the aim of the School of Business Administration to afford thorough training to those preparing to enter business in positions of responsibility. The school offers instruction of professional grade in the basic principles of management. It also affords an opportunity for more intensive training in certain specialized fields such as accounting, advertising, banking, foreign trade, personnel management, merchandising, real estate, traffic, and transportation.

In order to insure a broad training in basic principles, a considerable part of the work consists of required courses in the major phases of management. All students are expected to secure a sufficient acquaintance with the problems of production, marketing, finance, and personnel administration to enable them to view management in its broader aspects. The remainder of the work is devoted to more intensive studies in certain specialized lines of business for which a student has demonstrated particular aptitude.

Business is becoming more dependent upon the use of scientific method in the solution of problems which have developed as a result of recent trends in industry. The further development in large scale administration which is likely to occur in the future will increase the importance of scientific technique as a part of the equipment of the manager. Accounting and statistics constitute basic tools of quantitative measurements essential to the analysis of business problems. These subjects, therefore, are given a prominent place in the curriculum. Principles of accounting and the elements of statistics are both required of all students before admission to the school.

In addition to these subjects, it is essential for a student to have obtained a substantial training in other fields of study, particularly in economics. Additional courses in other social sciences are required in order that the student may have a clear understanding of the relationship of business to the more general interests of the community. The school aims to include with its professional training a well-rounded university education.

## LOCATION AND EQUIPMENT

The University of Minnesota is well situated with respect to education for business. With the business districts of the Twin Cities on either side, the opportunities for observing business processes and for effective field work and research are unsurpassed. The cordial support of business organizations and individual concerns in the Twin Cities is a large factor in making the resources of the metropolitan district available for developing and presenting subject-matter in every field of study covered. Equally valuable is the support of business men throughout the state. The close contact which members of the faculty have with the business of the Northwest greatly enhances the opportunities that students in the School of Business Administration enjoy. Co-operation with the College of Agriculture, Forestry, and Home Economics brings the School of Business Administration in contact with the agricultural background of many business problems. This co-operation is especially exemplified in the joint provision in the two schools for work in agricultural economics. Co-operation with Engineering, Law, and various departments of the College of Science, Literature, and the Arts is also an important factor in bringing many viewpoints to bear upon the business problems with which the student has to deal.

The library and laboratory facilities of the University contribute effectively to the success of the work which the School of Business Administration is undertaking.

## LABORATORY TRAINING ON THE CO-OPERATIVE PLAN

Arrangements have been made for a limited number of students to secure laboratory experience in business establishments. Under the co-operative plan, students are employed for definite periods of time during their university course. Students in the accounting sequence, for example, are placed in the offices of certified public accountants during the winter term of the senior year. They are taken on by the accounting firms as regular employees during that period, and are paid salaries in accord with the class of work performed. The work done by these students covers a considerable part of the general practice of an accounting firm including general auditing, income tax procedure, and the preparation of accounting reports. The students return to the University at the beginning of the spring term and complete their course by the end of the following summer term.

Similar arrangements have been made with some of the manufacturing, mercantile, and financial establishments of the Twin Cities. Students are given an opportunity in each of these positions to work in several departments in order to gain a knowledge of the business as a whole. A system of routing has been worked out in each case which enables the student to learn the details of business practice. Experience gained from these co-operative positions supplements the training in principles obtained in the classroom. It affords a form of laboratory work under actual business conditions which could not be duplicated on the campus.

## ADMISSION TO THE SCHOOL OF BUSINESS ADMINISTRATION

For admission to the school, a student must have satisfied the requirements of one of the two-year pre-business courses, either in the College of Science, Literature, and the Arts, the College of Agriculture, Forestry, and Home Economics, or the College of Engineering. (See page 11.) However, students entering from other colleges and universities of recognized standing may be admitted if deficient in not more than two of the following: accounting, psychology, statistics, provided (1) that such deficiency be removed during the first year in the school, and (2) that a minimum of 90 credits with one honor point per credit, be granted by the university examiner for the work done elsewhere.

## 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 for admission.

## 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 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. *Only those courses in the School of Business Administration are open to students of other schools or colleges of the University which are announced in the bulletin of that school or college.*

## ADVANCED STANDING

Appropriate credit may be given for work of a similar character done in other approved colleges and universities, but no student may become a candidate for a degree who has not completed the senior year under the faculty of the School of Business Administration.

## CREDITS

Requirements for graduation are expressed in credit hours, indicating amount of work done, and in honor points, indicating grade of work. Honor points are computed as follows: Each credit hour with the grade of A carries 3 honor points; each credit hour with the grade of B, 2 honor points; each credit hour with the grade of C, 1 honor point.

No regular student will be permitted to elect more than 17 hours of work in any one quarter unless he receives special permission by petition to the Students' Work Committee.

Candidates for the degree of bachelor of business administration must have earned a minimum of 180 credits and at least one honor point for each credit, (192 credits in the case of agricultural business and 187 credits in the case of industrial administration students) or a smaller number of cred-

its determined as follows: For every 5 honor points in excess of 1 honor point per credit, the number 180 is diminished by 1, but no student will be recommended for graduation who has not completed the courses in his major sequence.

#### MILITARY SCIENCE AND TACTICS

Students who have completed the Basic Course, R.O.T.C., 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 training camp, held normally during the summer following the first year's advanced work. The camp is conducted free of cost to the student, and in addition, while actually in camp, the student receives the pay prescribed for the seventh grade in the army. 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. This course carries twelve credits with one additional credit for every five honor points in excess of one honor point per credit.

#### REGISTRATION

Pre-business sophomores and students coming with advanced standing from other institutions should obtain from the university registrar copies of their records and submit them to the dean. In the case of pre-business students this must be done before the close of the quarter preceding entrance.

#### DEGREES

##### *Bachelor of Business Administration*

Candidates who have met the conditions for entrance, having satisfactorily completed the work covered in one of the pre-business courses at the University of Minnesota, should normally be able to qualify for the degree of bachelor of business administration at the end of two full academic years of study in the school.

If within a reasonable time after admission to the school, a student's work does not give promise of effectiveness in the business field, he will be advised to withdraw from the course, even tho he may have received passing grades in the subjects taken. It is expected that students will meet the requirements imposed with the same professional spirit and measure of precision demanded in well-regulated business houses, and students who fail to come up to the standard will not be recommended for the degree.

##### *Master of Science in Business*

Students who have completed the course of study required for the degree of bachelor of business administration or its equivalent may enroll in the Graduate School and become candidates for the degree of master of science in business. Emphasis will be laid on individual work under the direction of particular members of the faculty rather than upon class in-

struction, and the student must present evidence of at least six months of successful experience in a responsible business position.

The general requirements for the Master's degree may be found in detail in the annual announcement of the Graduate School.

#### EMPLOYMENT OF STUDENTS

Every effort is made to find positions for those students and graduates who have made a good record. Many business men have expressed a desire to co-operate with the school in placing the students both for summer work and in permanent positions. Communications concerning positions should be addressed to the School of Business Administration.

#### FEEES

Tuition fees (per quarter)	
Residents of Minnesota.....	\$30.00
Non-residents .....	40.00
Incidental fee (per quarter).....	6.00
Deposit (first quarter only).....	5.00
Military deposit (required of all students taking military drill).....	10.00
Special fees:	
Examination for removal of condition.....	5.00
Examination for credit (after the first quarter in residence)....	5.00
Special examination .....	5.00
Chemistry deposit .....	5.00
Graduation fee .....	10.00

#### *Penalty Fees*

*Registration penalties.*—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

For information concerning living expenses, students are referred to the bulletin of general information.

The School of Business Administration does not encourage students to enter entirely without funds. The intensive work required in the school will make it highly desirable for a person to devote all of his time and energy to his studies.

#### STUDENT ORGANIZATIONS

##### *The Commerce Club*

The Commerce Club was organized by the students of the School of Business in the fall of 1919. The object of the club is to bring the men of the school together in an informal way for the purpose of promoting a serious interest in business problems. Some prominent business men address the students at each meeting. Membership is confined to the students and faculty of the school and to pre-business students in the College of Science, Literature, and the Arts.

##### *Beta Gamma Sigma*

A chapter of the national honorary business fraternity, Beta Gamma Sigma, is located at the University. Members are selected chiefly on the

basis of scholarship. Students who have completed two terms' work in the school are eligible. Elections of new members take place in the spring for juniors and in the fall for seniors. Total membership is limited to one fifteenth of the junior men and one tenth of the senior men enrolled in the school.

*The University Business Women's Club*

This is an organization of business and pre-business women. Its purposes are: (1) to form direct contacts with business problems through addresses by successful business men and women and visits to business establishments; (2) to bring together in a social way university women interested in business.

*Gamma Epsilon Pi*

Gamma Epsilon Pi, a national honorary commerce sorority, has a chapter at the University of Minnesota. The membership, composed of a group of women from the junior and senior classes, may never exceed fifteen per cent of the number of women enrolled in the school. Election is based upon scholarship, leadership, and personality.

*Gopher Business News*

The *Gopher Business News* is a periodical published by the students of the School of Business Administration. There are four regular issues each year from September to June, inclusive, containing articles by business men, members of the faculty, and students. The magazine is controlled by a board consisting of three members of the faculty and four students. This board appoints the managing editor and business manager from the student body. These officers in turn select the students to serve as members of the editorial and business staffs. Membership on the board of control and participation on the editorial or business staffs are considered honors and they afford opportunity for training in business. Work done on the *News* is given weight in awarding honors in the school.

SCHOLARSHIPS AND AWARDS

*The Minneapolis Advertising Club Scholarship*

The Minneapolis Advertising Club awards annually in June a scholarship of \$100 to a senior student in the School of Business Administration on vote of a committee consisting of the dean of the School of Business Administration, two other faculty members appointed by the dean, and the president and secretary of the Minneapolis Advertising Club.

*The Staring Realtor Scholarship*

The Staring Realtor Scholarship of \$100 to be awarded annually on recommendation of the faculty of the School of Business Administration to a senior student pursuing the real estate sequence was presented by Mr. Stanley Staring in 1927. The first award was made in 1928.



*Alpha Kappa Psi Tablet*

A tablet was presented to the school in 1926 by the Alpha Kappa Psi, professional commerce fraternity, which maintains a chapter at the University. This tablet is placed in a prominent place in the corridors of the Business Building. According to the terms of the gift, the names of the three students in each graduating class who have done the most to promote the interests of the School of Business Administration are to be inscribed on the tablet. The committee of award consists of three faculty members to be selected by the dean, a representative from each of the professional fraternities, a representative of the Business Women's Club, and one student not holding membership in any of the organizations mentioned.

*Delta Sigma Pi Key*

A gold key is awarded each year to the student who, during his entire course, has maintained the highest average in scholarship. This key is presented by the professional commerce fraternity, Delta Sigma Pi, which maintains a chapter at the University.

## COURSES OF STUDY

### FRESHMAN AND SOPHOMORE YEARS

The work of the freshman and sophomore years known as the pre-business course is, in most cases, taken in the College of Science, Literature, and the Arts. For students interested in agricultural business, the pre-business course is taken in the College of Agriculture, Forestry, and Home Economics. A pre-business course in the College of Engineering and Architecture is available for students expecting to engage in manufacturing.

I. The two-year pre-business course in the College of Science, Literature, and the Arts, required for admission to the School of Business Administration, is made up as follows:

1. Five credits in Business Organization: Marketing (Economics 1)
2. Five credits in Business Organization: Production (Economics 2)
3. Five credits in Mechanism of Exchange (Economics 3)
4. Nine credits in Composition (Composition 4-5-6)
5. Ten credits in *one* of the following social sciences: geography, history, political science, sociology
6. Ten credits in mathematics or in *one* of the following laboratory sciences: botany, chemistry, physics, zoology, (Mathematics 8 and 20 are required of students who intend to specialize in accounting or banking.)
7. Six credits in psychology (Psychology 1-2)
8. Five credits in Principles of Economics (Economics 4)
9. Three credits in Elements of Accounting (Economics 20)<sup>1</sup>
10. Six credits in Principles of Accounting (Economics 25-26)
11. Five credits in Elements of Statistics (Economics 14)
12. Sufficient electives to make a minimum of 90 credits with one honor point per credit, or a smaller number of credits to be determined as follows: for every five honor points in excess of one honor point per credit, the number 90 is diminished by one.

II. Students who wish to prepare for some branch of business which relates to agriculture, such as the marketing of farm products, farm finance, farm implements, farm real estate, country merchandising, and the like, will find it to their interest to include courses in agriculture as part of their pre-business training. This may be arranged by registering in the College of Agriculture, Forestry, and Home Economics and taking the following courses:

1. Ten or twelve credits in General Inorganic Chemistry (Chemistry 1-2-3)
2. Five credits in Types and Breeds of Livestock (Animal Husbandry 11-12)
3. Nine credits in Rhetoric (Rhetoric 1-2-3)
4. Nine credits in General Botany (Botany 4-5-6)
5. Three credits in Rural Economics (Agricultural Economics 8)
6. Five credits in Economic History of Agriculture (Agricultural Economics 6)
7. Five credits in Elements of Dairying (Dairy Husbandry 1)
8. Three credits in Agricultural Engineering (Agricultural Engineering 13, 28, 31, or 37)
9. Five credits in Principles of Economics (Agricultural Economics 1)
10. Three credits in Agricultural Economics (Agricultural Economics 2)

<sup>1</sup> Students who have had a high school course or experience in bookkeeping may be exempt from this course and admitted to Economics 25 by passing a placement test.

- 11. Nine credits in General Zoology (Zoology 14-15-16)
- 12. Three credits in Farm Crops (Agronomy 1)
- 13. Three credits in Elements of Accounting (Economics 20)<sup>1</sup>
- 14. Six credits in Principles of Accounting (Economics 25, 26)
- 15. Five credits in Mathematics (Agricultural Engineering 9-10 or 11, or Mathematics 5 or 8)
- 16. Three credits in Fruit Growing (Horticulture 6) or Vegetable Growing (Horticulture 32)
- 17. Five credits in Farm Finance (Agricultural Economics 50)
- 18. Six credits in psychology (Psychology 1-6)
- 19. Sufficient work from the following list to make a minimum of 102 credits:
  - a. Six credits in Soils (Soils 4-5)
  - b. Five credits in Argumentation (Rhetoric 11) or Public Speaking (Rhetoric 22)
  - c. Five credits in Agricultural Physics (Agricultural Engineering 23)
  - d. Five credits in Commerce Algebra (Mathematics 8) or Applied Mathematics
  - e. Five credits in bacteriology (Bacteriology 51)
  - f. Ten credits in agricultural biochemistry (Agricultural Biochemistry 7-8)
  - g. Two credits in mechanical drawing (Agricultural Engineering 3)

A standing of one honor point for each credit is required for admission to the School of Business Administration.

*Students considering this group of courses should consult the bulletin of courses in agriculture for further particulars as to courses, registration, etc.*

III. Students who expect to engage in administrative work in manufacturing industries, should take their pre-business work in the College of Engineering and Architecture. The following prescribed program<sup>2</sup> for the freshman and sophomore years must be completed prior to registration in the course in Industrial Administration in the School of Business Administration. A minimum of 97 credits is required for admission to the school from this course.

FRESHMAN YEAR			
FALL	Credits	WINTER	Credits
M. & M. 11 College Algebra	5	M. & M. 12 Trigonometry	5
Chem. 4 General Inorganic Chemistry	4	Chem. 5 General Inorganic Chemistry	4
or		or	
Chem. 14 General Inorganic Chemistry	5	Chem. 15 General Inorganic Chemistry	5
Rhet. 4 Rhetoric and Composition	3	Rhet. 5 Rhetoric and Composition	3
Draw. 1 Engineering Drawing	3	Draw. 2 Engineering Drawing	3
M.E. 11, 12, or 13 Shop Practice	2	M.E. 11, 12, or 13 Shop Practice	2
G.E. 11 Orientation	0	G.E. 12 Orientation	0
Mil. 1 Military Science and Tactics	0	Mil. 2 Military Science and Tactics	0
	17 or 18		17 or 18
M. & M. 13 Analytic Geometry	5	Qualitative Analysis	5
Rhet. 6 Rhetoric	3	Draw. 3 Descriptive Geometry	3
M.E. 11, 12, or 13 Shop Practice	2	P.H. 2 Hygiene and First Aid	0
Mil. 3 Military Science and Tactics	0		0
	18		18

<sup>1</sup> Students who have had a high school course or experience in bookkeeping may be exempt from this course and admitted to Economics 25 by passing a placement test.

<sup>2</sup> See bulletin of College of Engineering and Architecture for description of courses.

COURSES OF STUDY

SOPHOMORE YEAR

FALL		WINTER		SPRING	
	Credits		Credits		Credits
M. & M. 91	Calculus.. 4	Phys. 23	Heat ..... 3	M. & M. 84	Technical
Phys. 3	Mechanics & Sound ..... 3	Phys. 24	Heat Lab. ... 1		Mechanics ..... 5
Phys. 4	Mechanics & Sound Lab. .... 1	Econ. 3	Mechanism of Exchange ..... 5	Phys. 43	Electricity & Magnetism ..... 3
Econ. 8	General Economics ..... 3	Econ. 9	General Economics ..... 3	Phys. 44	Electricity & Magnetism Lab. .... 1
M.E. 17	Machine Shop 2	Econ. 20	Elements of Accounting ..... 3	Econ. 14	Elements of Statistics ..... 5
Psy. 1	General Psychology ..... 3	Psy. 2	General Psychology ..... 3	Econ. 25	Principles of Accounting ..... 3
M.E. 21	Mechanical Tech. .... 1				
			18		17
	17				

JUNIOR AND SENIOR YEARS

The work of the junior and senior years is taken in the School of Business Administration, where stress is laid upon the adaptation of the student's curriculum to his future plans. In order to make this aim effective, every student is assigned to an adviser who makes a study of his needs and helps him to frame a program which will most nearly meet them.

The programs of study summarized below will therefore be varied as each particular case dictates. In some cases the student will be advised to elect subjects in other schools and colleges of the University in order to obtain a well-rounded preparation for his prospective career.

*The core group.*—The following courses constitute a core of material which should be covered by all students. In addition to these courses, there are certain required subjects in the various sequences. Unless an exception is specifically noted in connection with a sequence, all courses listed in this group will be required.

Exceptions may be made in individual cases upon petition approved by the adviser and the dean.

JUNIOR YEAR

	Credits
Business Law (Econ. 51, 52, 53).....	9
Monetary and Banking Policy (Econ. 141).....	3
Advanced General Accounting (Bus. Adm. 139).....	3
Corporation Finance (Bus. Adm. 155).....	3
Market Administration (Bus. Adm. 67).....	3
Traffic Management (Bus. Adm. 71).....	3
Business Statistics (Bus. Adm. 112).....	3
Report Writing (Bus. Adm. 100).....	1
	28

## SENIOR YEAR

	Credits
Advanced General Economics (Bus. Adm. 101-102).....	6
Business Policy (Bus. Adm. 109).....	3
Business Cycles (Econ. 149).....	3
Labor Problems (Econ. 161).....	3
Public Finance (Bus. Adm. 58).....	3
Public Utilities (Econ. 154).....	3
Production Management (Bus. Adm. 89).....	3
	24

## I. THE GENERAL COURSE IN BUSINESS

Advisers, Mr. Mudgett and Mr. Stead

The course is recommended to those persons who desire a well-balanced training in the important fields of business education, or for those who have not decided upon a specialized field of study. The sequence includes the courses required of all juniors and seniors in the School of Business Administration (see Core Group above) and, in addition, Geography 61, Geography of Commercial Production (to be taken preferably in the junior year) and Business Administration 130, Cost Accounting Survey.

A student taking his degree in the general business sequence has available a considerably wider range of electives than is the case in the specialized sequences given hereafter. These electives offer to the student the opportunity of pursuing an interest, in fields associated with his general training, in the social or natural sciences or in the arts. It is desirable that sufficient electives be taken in a given field to familiarize the student with something more than an introductory course. The following are suggested as fields for election and the courses within these fields may be arranged to meet the needs of individual students:

Anthropology	History
Botany	Journalism
Economics and Business Administration	Mathematics
English Literature, Composition, Speech	Philosophy
Geography	Political Science
Geology and Mineralogy	Psychology
Modern Foreign Languages	Sociology
	Zoology

## II. ACCOUNTING

Adviser, Mr. Heilman

The program in accounting is designed to meet the needs of those persons who are preparing for public accounting, the teaching of accounting, or for positions as accountants in financial or business establishments.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Cost accounting (Bus. Adm. 131-132).....	6
Accounting Practice and Procedure (Bus. Adm. 137-138).....	6
Electives .....	5
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Income Tax Accounting (Bus. Adm. 134).....	3
Auditing (Bus. Adm. 135).....	3
Senior Topics Course—Accounting (Bus. Adm. 181-182A)....	6
Electives .....	9
	—
	45

## III. ADVERTISING

Adviser, Mr. Vaile

The program in advertising is designed to prepare students for work either in advertising agencies or in advertising departments of merchandising establishments and of newspapers. Preliminary training is given in commercial art. Special emphasis is placed on the use of advertising in constructive merchandising.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Psychology of Advertising (Psy. 56).....	3
Advertising (Bus. Adm. 88).....	3
Introduction to Reporting (Jour. 13).....	3
Copyreading and Make-Up—Short Course (Journ. 41).....	3
Writing of Special Articles (Jour. 69) .....	3
Electives .....	2
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Commercial Art (Bus. Adm. 64-65-66).....	6
Advanced Advertising Procedure (Bus. Adm. 194-195-196)....	3
Senior Topics Course—Marketing (Bus. Adm. 182C).....	3
Electives .....	9
	—
	45

## IV. AGRICULTURAL BUSINESS

Adviser, Mr. Price

This line of specialization is intended for students who wish to prepare for some branch of business which relates to agriculture, such as the marketing of farm products, farm finance, farm implements, farm real estate, country merchandising, and the like. The student should also take supplementary courses in technical agriculture. It is recommended that as many as possible of these be taken during the pre-business years. During the junior and senior years students in this sequence are registered jointly in the College of Agriculture, Forestry, and Home Economics and the School of Business Administration. One hundred ninety-two credits are required for graduation from this course.

## JUNIOR YEAR

Substitutions may be made for Corporation Finance (Bus. Adm. 155), Market Administration (Bus. Adm. 67) and Business Statistics (Bus. Adm. 112) in the core group requirements for students in this sequence.

	Credits
Core group requirements.....	19
Economics of Agricultural Production (Agr. Econ. 110-111)...	6
Principles of Marketing Organization (Agr. Econ. 40-141-142)...	8
Agricultural Statistics (Agr. Econ. 90).....	5
Prices of Farm Products (Agr. Econ. 30).....	3
Market Prices (Agr. Econ. 131).....	3
Electives .....	1
	—
	45

## SENIOR YEAR

Substitutions may be made for Business Policy (Bus. Adm. 109), Labor Problems (Econ. 161), Production Management (Bus. Adm. 89), and Public Utilities (Econ. 154) in the core group requirements for students in this sequence.

	Credits
Core group requirements.....	12
Methods of Price Analysis (Agr. Econ. 135).....	3
Advanced Farm Finance (Econ. 150).....	3
Land Economics (Econ. 170).....	3
Electives .....	24
	—
	45

## V. FINANCE

Adviser, Mr. Stehman

This program of courses is designed to meet the needs of persons who will ultimately secure connections with financial institutions such as banks and bondhouses or with the financial departments of other concerns.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Electives .....	17
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Finance Management (Bus. Adm. 156).....	3
Bank Administration (Bus. Adm. 147).....	3
Investments (Bus. Adm. 146).....	3
Foreign Exchange (Bus. Adm. 145).....	3
Senior Topics Course—Finance (Bus. Adm. 180-181-182B)....	6
Comparative Banking—British Systems (Econ. 124).....	3
	—
	45

COURSES OF STUDY

VI. FOREIGN TRADE

Adviser, Mr. Blakey

This sequence is designed for persons who plan to associate themselves with exporting houses or with export departments of large manufacturing and mercantile establishments.

JUNIOR YEAR

	Credits
Core group requirements.....	28
Geography of Commercial Production (Geog. 61).....	5
Foreign Exchange (Bus. Adm. 145).....	3
Advertising (Bus. Adm. 88).....	3
Electives .....	6
	—
	45

SENIOR YEAR

	Credits
Core group requirements.....	24
Commercial Policies (Econ 176).....	3
Foreign Trade (Bus. Adm. 177).....	3
International Law (Pol. Sci. 121-122).....	6
Electives .....	9
	—
	45

VII. PERSONNEL MANAGEMENT

Advisers, Mr. Paterson and Mr. Stead

This program offers basic training to (1) prospective workers in personnel departments of business establishments, and (2) to persons who expect to participate in the adjustment of matters pertaining to the employment of labor.

JUNIOR YEAR

	Credits
Core group requirements.....	28
Labor Movement (Econ. 162).....	3
Personnel Administration (Bus. Adm. 167).....	3
Advanced Personnel Administration (Bus. Adm. 168).....	3
Electives .....	8
	—
	45

SENIOR YEAR

	Credits
Core group requirements.....	24
Labor Legislation and Social Insurance (Econ. 164).....	3
Psychology in Personnel Work (Psy. 160).....	3
Vocational Psychology (Psy. 130).....	3
Senior Topics Course—Personnel (Bus. Adm. 180-181-182D).....	9
Electives .....	4
	—
	45



## VIII. MERCHANDISING

Adviser, Mr. Vaile

The electives in this program may be so chosen as to prepare the student for work in the merchandising department either of manufacturing, wholesaling, or retailing establishments.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Psychology of Advertising (Psy. 56).....	3
Advertising (Bus. Adm. 88).....	3
One of the following:	
Sales Management (Bus. Adm. 68).....	} 3
Retailing (Bus. Adm. 69).....	
Marketing Farm Products (Econ. 108).....	
Electives .....	8
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Senior Topics Course—Marketing (Bus. Adm. 180-181C).....	6
One of the following:	
Senior Topics Course—Marketing (Bus. Adm. 182C)....	} 3
Market Prices (Econ. 187).....	
Transportation Charges (Bus. Adm. 73).....	3
Electives .....	9
	—
	45

## IX. REAL ESTATE

Adviser, Mr. Stevenson

This sequence is designed particularly for those students who are interested in real estate practice. Its object is to prepare those expecting to enter general real estate offices or to become connected with financial organizations such as building and loan associations and mortgage companies.

## JUNIOR YEAR

Real Estate Law is substituted for Pol. Sci. 53, Business Law, in this sequence.

	Credits
Core group requirements.....	25
Psychology of Advertising (Psy. 56).....	3
Advertising (Bus. Adm. 88).....	3
Property Insurance (Bus. Adm. 60).....	3
Economic Aspects of Population and Immigration (Econ. 163)	3
Real Estate Valuation and Land Utilization (Bus. Adm. 152)..	3
Electives .....	5
	—
	45

SENIOR YEAR

	Credits
Core group requirements.....	24
State and Local Taxation (Econ. 193).....	3
City Planning (Mun. and San. Eng. 272).....	3
Building Construction (Arch. 51,52,53).....	6
Real Estate Management and Practice (Bus. Adm. 153).....	3
Real Estate Law (Bus. Law D).....	3
Electives .....	3
	45

X. SECRETARIAL

Adviser, Mrs. Gray

The courses offered in this program are arranged for the training of secretaries and assistants. The student should select, with the help of his adviser, the courses which will best prepare him for the special type of secretarial work he expects to enter. Among the positions for which he may prepare are the following: office manager and assistant; private secretary to persons engaged in educational, social, philanthropic, scientific, medical, legal, religious, literary, professional, or mercantile work; secretary in schools and institutions; business correspondent; registrar; civil service.

JUNIOR YEAR

	Credits
Core group requirements.....	28
Types of Writing (Comp. 18-19).....	6
Secretarial Training—Dictation I-II (Econ. 40-41).....	10
Elective .....	1
	45

SENIOR YEAR

	Credits
Core group requirements.....	24
Office Organization and Management (Bus. Adm. 86).....	3
Senior Topics Course—Secretarial (Bus. Adm. 180-181E)....	6
Electives .....	12
	45

XI. INDUSTRIAL ADMINISTRATION

Adviser, Mr. O'Hara

This course follows the two-year pre-business course given in the College of Engineering and Architecture. The program is designed primarily for students who expect to engage in purchasing, sales, employment, production, control or cost accounting work in manufacturing establishments.

## JUNIOR YEAR

Substitution may be made for Business Statistics (Bus. Adm. 112) in this sequence.

	Credits
Core group requirements.....	25
Strength of Materials (M. & M. 85).....	4
Principles of Accounting (Econ. 26).....	3
Electives .....	13
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Cost Accounting Survey (Bus. Adm. 130).....	3
Personnel Administration (Bus. Adm. 167).....	3
Senior Topics Course—Production Management (Bus. Adm. 180-181G) .....	6
Electives .....	9
	—
	45

## XII. STATISTICS

Adviser, Mr. Mudgett

This sequence is designed for students who intend to become statisticians for business firms or associations. The student will be required to take the core courses required of all juniors and seniors in the School of Business Administration with the exception of Labor Problems (Econ. 161), Production Management (Bus. Adm. 89), and Traffic Management (Bus. Adm. 71), for which suitable courses in mathematics may be substituted. The statistics sequence therefore shall include the following:

## JUNIOR YEAR

	Credits
Core group requirements.....	25
Theory of Statistics (Econ. 113,114).....	6
Pre-Statistical Mathematics (Math. 47-48-49).....	12
Electives .....	2
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	18
Market Prices (Econ. 187).....	3
Senior Topics Course—Statistics (Bus. Adm. 180-181-182F) ..	9
Investments (Bus. Adm. 146).....	3
Cost Accounting (Bus. Adm. 130).....	3
Securities Market (Bus. Adm. 148).....	3
Electives .....	6
	—
	45

## XIII. TRAFFIC AND TRANSPORTATION

Adviser, Mr. Butterbaugh

This sequence is designed for those persons who wish to prepare for traffic work with shippers and carriers. A sufficient number of general courses are included to meet the needs of those who expect to obtain executive positions involving only an incidental amount of traffic work.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Geography of Commercial Production (Geog. 61).....	5
Trade Routes and Trade Centers (Geog. 102).....	3
Foreign Trade (Bus. Adm. 177).....	3
Sales Management (Bus. Adm. 68).....	3
Transportation Services (Bus. Adm. 72).....	3
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Transportation Charges (Bus. Adm. 73).....	3
Traffic Law (Bus. Adm. 74).....	3
Cost Accounting Survey (Bus. Adm. 130).....	3
Property Insurance (Bus. Adm. 60).....	3
Law of Public Utilities (Pol. Sci. 159).....	3
Electives .....	6
	—
	45

## RELATED COURSES IN OTHER COLLEGES

- I. Commercial Education. Students desiring to teach commercial subjects in high schools are advised to register for the course in commercial education in the College of Education. Students completing this course receive the degree of bachelor of science in education and meet the state requirements for teaching commercial subjects.
- II. The following course is given under the direction of the Department of Political Science, College of Science, Literature, and the Arts:  
*Diplomatic and Consular Service.*—Students looking forward to this field of work should take a major sequence in political science and such additional work in economics, history, geography, languages, and law as may be prescribed by the major adviser or the committee in charge of the course. A fifth year of work to be taken in the Graduate School is also strongly recommended. Consult Mr. Quigley.

## DESCRIPTION OF COURSES

### ACCOUNTING

- Econ. 20. Elements of Accounting. The 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.
- Econ. 25-26. Principles of Accounting. A course following Econ. 20 presenting the principles underlying the accounting statements, the accounts, principles of valuation, depreciation, preparation, and analysis of statements.
- Bus. Adm. 130. Cost Accounting (General Survey). A general survey of cost accounting from the point of view of the executive who must use cost information in the conduct of his business.
- Bus. Adm. 131-132. Cost Accounting. Cost accounting practices and procedures.
- Bus. Adm. 133. Cost Accounting Systems. Cost accounting as applied in specific industries and the construction of cost systems.
- Bus. Adm. 134. 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.
- Bus. Adm. 135-136. Auditing. The principles and technical methods of professional auditing practice. Prevention and detection of fraud and errors in accounting records, auditors' writing papers, financial exhibits, certificates, and reports. Accounting systems and methods as related to executive control of routine procedures and the establishment of financial and budgetary control.
- Bus. Adm. 137-138. Accounting Practice and Procedure. A course in the practice and technique of accounting for students who intend to specialize in accounting.
- Bus. Adm. 139. 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.
- Bus. Adm. 181-182A. (Winter and spring.) Senior Topics Course—Accounting. Application of accounting theory, practice, and analysis to special fields of industry and finance. Term reports, solution of C. P. A. problems.

### ADMINISTRATION

- Bus. Adm. 109. Business Policy. This course is devoted to the study of problems of a general administrative character. Cases involving broad business policies are presented for class discussion and reports. These

cases involve questions of valuation, budgetary control, industrial promotions, and combinations and reorganization.

- Bus. Adm. 183. Senior Practice Course. Students engaged in outside work on the co-operative plan may register for the course for credit under the following conditions: The type of employment to be undertaken must be approved in advance by the major adviser. The student must register for the course at the beginning of the term during which the work is to be done. He may register on the credit hour basis and thus avoid the payment of full tuition fees for the term. Grades in this course are based upon a report from the student's employer and a formal written report presented by the student not later than the mid-term following his return to the University. Applications for positions on the co-operative plan and admission to the course may be made at any time at the dean's office.

#### ADVERTISING

- Econ. 56. Psychology of Advertising. Psychological analysis of advertising. Intensive study of national and local advertising from the standpoint of attention, association, memory, desire, and action. Assigned readings, observation, experiments, reports.
- Bus. Adm. 64-65-66. Commercial Art. The elements of art as applied to commercial projects including consideration of lettering, hand print processes, machine print processes, design, and illustration as applied to the printed page.
- Bus. Adm. 88. Advertising. The course covers two important phases of advertising: (1) the place of advertising in business, (2) advertising procedure. Attention is given to planning an advertising campaign, including market research, appropriation, choice of media, scheduling, preparation of copy, and layout.
- Bus. Adm. 194-195-196. Advanced Advertising Procedure. Problem or case work in (1) market research, (2) preparation of copy and layout.

#### AGRICULTURAL ECONOMICS

See bulletin of College of Agriculture, Forestry, and Home Economics.

- Agr. Econ. 110-111. Economics of Agricultural Production I and II.
- Agr. Econ. 126. Economics of Consumption.
- Agr. Econ. 130. Prices of Farm Products.
- Agr. Econ. 135. Methods of Forecasting Prices.
- Agr. Econ. 145-146. Marketing Management.
- Agr. Econ. 171. Land Tenure.

#### COMMERCE

- Econ. 176. 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.

Bus. Adm. 177. Foreign Trade. Theories of international trade, character of United States foreign trade and the world market. Commercial organization and foreign trade financing, foreign shipments—export and import. Transportation and shipping problems, governmental regulation, and individual markets.

### ECONOMIC THEORY

Econ. 4. Principles of Economics. A course in the fundamental principles of economics which is intended to serve as a foundation for advanced courses in business administration.

Bus. Adm. 101-102. 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.

Econ. 105. History of Economic Ideas—The Classical Economists. The development of the doctrines of classical economics by English and French writers from 1750 to 1850. Economic and political influences giving rise to doctrines of population, distribution, governmental interference.

Econ. 106. History of Economic Ideas—The Critics of the Classical Economists. Leading critics of the classical school of economics are studied, especially such critics as (1) Karl Marx and Henry George who emphasized the dynamic aspects of economic life, (2) the nationalistic school, (3) the historical school, (4) and the modern institutionalists.

### FINANCE

Econ. 3. The Mechanism of Exchange. An elementary course in money and banking. The basic principles of money and a description of each of the various types of financial institutions, its functions and its relation to the whole economic organization.

Bus. Adm. 58. Elements of Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens. This is a condensed course given especially for Business Administration students.

Econ. 124. Comparative Banking—British Systems. A study of the existing financial institutions of the various members of the British Empire with regard to development, functions, methods, and problems. Constant comparison is made with the American system.

Econ. 125. Comparative Banking—European Systems. Similar to Course 124, except that five of the continental systems will be studied instead of the British systems.

Econ. 141. Monetary and Banking Policy. An advanced course in money and banking. Banking policy viewed from the social viewpoint, with primary reference to the problems of the Federal Reserve system.

Selected problems in monetary policy: monetary reconstruction and monetary reform.

- Bus. Adm. 145. Foreign Exchange. The drawing and handling of international bills of exchange of all kinds; relations of correspondent banks; acceptance accounts; calculation of bankers' buying and selling prices; investment speculation, and arbitrage in exchange; exchange and the money market.
- Bus. Adm. 146. 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.
- Bus. Adm. 147. Bank Administration. Designed for students intending to enter the field of commercial banking. Less emphasis is placed upon the routine of bank operation than upon the problems of the bank executive. The legal background is stressed throughout.
- Bus. Adm. 148. The Securities Market. A continuation of Course 146, describing the mechanism of the stock exchanges in New York, London, Berlin, and Paris. The technique of speculation by taking advantage of favorable external and internal factors and the business of the investment house and the bond salesman.
- Econ. 149. 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.
- Bus. Adm. 150. Advanced Farm Finance. The farmer's credit requirements; institutions supplying agricultural credit; adequacy of their service.
- Bus. Adm. 155. Corporation Finance. New business; form of organization; individual proprietorship, partnership, corporation. 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 reorganization.
- Bus. Adm. 156. Finance Management. The duties of the financial manager of a modern business. The various sources from which capital may be secured, the best use of a company's funds, and special financial problems which arise in the typical business.
- Bus. Adm. 180-181-182B. Senior Topics Course—Finance. A weekly conference of finance faculty and seniors. Individual research and discussion of important current financial developments.
- Econ. 191-192. Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens.
- Econ. 193. State and Local Taxation. Main problems of state and local finance and proposed solutions therefor.

#### GEOGRAPHY

See bulletin of the College of Science, Literature, and the Arts.

Geog. 33. Climatology.

Geog. 51. Human Geography.

Geog. 52. Regional Geography of the World.



- Geog. 61. Geography of Commercial Production.  
 Geog. 71. Geography of North America.  
 Geog. 102. Trade Routes and Trade Centers.  
 Geog. 135. Geography of Minnesota.

### HISTORY (Economic)

See bulletin of the College of Science, Literature, and the Arts.

- Hist. 80-81. Introduction to Economic History (Econ. 80-81).  
 Hist. 82-83-84. Economic History of the United States (Econ. 82-83-84).  
 Hist. 113-114-115. Economic History of Europe and the United States, 1750 to the Present (Econ. 118-119-120).  
 Hist. 116-117-118. Economic History of Europe, 1300-1750 (Econ. 121-122-123).  
 Hist. 169. Topics in Economic History (Econ. 175).

### INSURANCE

- Bus. Adm. 59. Life Insurance. The economic significance of life insurance. Types of policies and the analysis of the policy contract. Principles underlying the determination of premiums and reserves. Industrial, fraternal, and group insurance.  
 Bus. Adm. 60. Property Insurance. The fire risk and fire prevention. Fire insurance and insurance carriers. The standard policy. Methods of rate making. State regulation and supervision. Marine risks and insurance. Miscellaneous property lines.  
 Bus. Adm. 61. Casualty Insurance. A detailed study of the risks, insurance coverages, and policy provisions in the more important lines of casualty insurance. Accident and health insurance, employers' liability and workmen's compensation, automobile, robbery and theft, plate glass and miscellaneous liability, and damage types of insurance.

### JOURNALISM

See bulletin of the College of Science, Literature, and the Arts.

- Jour. 13. Introduction to Reporting—Short Course (Econ. 35).  
 Jour. 41. Copy Reading and Make-Up (Econ. 36).  
 Jour. 69. The Writing of Special Articles (Econ. 50).

### LABOR AND PERSONNEL

- Econ. 161. Labor Problems and Trade Unionism. A discussion of employment; hours; wages; extent and strongholds of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes.  
 Econ. 162. Labor Movements. An interpretation of leading labor movements in Europe and the United States during the last century.

- Econ. 163. Economic Aspects of Population and Immigration. Population and immigration trends, economic interpretations of these trends with probable forecasts. Various population theories are studied.
- Econ. 166. Contemporary Economic Problems. A survey of current problems including monetary stabilization, reparations, international debts and the Dawes Plan, foreign investments and economic imperialism, international cartels and tariff barriers, international wage levels, population and immigration movements.
- Bus. Adm. 167. Personnel Administration. Managerial policy for various types of organization of labor. Special attention to job analysis, employment incentives, and regularization of employment.
- Bus. Adm. 168. Advanced Personnel Administration. Special attention to employee training, joint relations, health and safety, and methods of personnel research, e.g., by analysis of labor turnover.
- Bus. Adm. 180-181-182D. Senior Topics Course—Personnel Management. Discussions and individual investigation of various features of a personnel program. Study of actual practices and conditions prevailing in the Twin City area.

### MATHEMATICS

See bulletin of the College of Science, Literature, and the Arts.

- Math. 8. Commerce Algebra.
- Math. 20. Mathematics of Investment.
- Math. 47-48-49. Mathematics for Students of Statistics.

### MARKETING

- Econ. 1. Business Organization: Marketing. An introduction to the economics of marketing, including descriptions of (1) the marketing processes, (2) produce exchanges and speculation on these exchanges, (3) co-operative marketing institutions, (4) market areas. The operation of supply and demand in marketing.
- Bus. Adm. 67. Market Administration. Deals with marketing policies. Special emphasis is given to problems in the following fields: (1) sales force organization, (2) research and sales planning, (3) policies relating to the product, (4) price policies, (5) marketing costs.
- Bus. Adm. 68. Sales Management. Organization and direction of a sales organization from the sales manager's point of view. Topics: sales organization; management of the sales force, sales planning and research; sales campaigns, salesmanship and selling methods, compensation of salesmen, supervision and control. Method: case studies.
- Bus. Adm. 69. Retail Store Management. Location, organization, and layout. Buying and sales budget and sales planning, stock control, sales promotion, interior and window display, store services, credits and collections, store operation, finance and general policy. Method: lecture and discussion.

- Econ. 108. Marketing Organization: Agricultural Products. The principles of organization of the market and of marketing enterprises applied especially to farm products. (Not open to those taking the agricultural business course of study.)
- Bus. Adm. 180-181C. (Fall and winter.) Senior Topics Course—Marketing. Selected topics in (1) market structure, (2) manufacturer's sales problems, (3) price policies, (4) trade association activities.
- Bus. Adm. 182C. (Spring.) Senior Topics Course—Marketing. Selected topics in retail store management, in co-operation with Twin City department store executives. Open, with permission of instructor, to a limited number of advanced students who have not taken 180-181C.
- Econ. 187. Market Prices. The behavior of prices. The elasticity of supply and demand. The manner in which individuals determine their buying and selling prices.

#### POLITICAL SCIENCE

See bulletin of the College of Science, Literature, and the Arts.

- Pol. Sci. 51-52-53. Business Law. A discussion of the legal principles and laws of contracts, agency, and negotiable instruments. Also a consideration of problems of organization in individual businesses, partnerships, and corporations. The case method is followed in this course (Econ. 51-52-53).
- Pol. Sci. 107. Recent Social Legislation (Econ. 157).
- Pol. Sci. 109. Government and Business (Econ. 158).
- Pol. Sci. 111. Law of Public Utilities (Econ. 159).

#### PRODUCTION

- Econ. 2. Business Organization: Production. Description of industrial organization. An elementary treatment of the economic principles involved in production.
- Bus. Adm. 89. Production Management. Location and layout of industrial plants; types of operating organization; shop personnel; standards of operation; purchasing and inventory control; routing, scheduling, and despatching of product; scientific management; practical problems in production control.
- Bus. Adm. 180-181-182G. Senior Topics Course—Production Management. Selected problems in management; studies in the technique of executive control in manufacturing enterprises; field research and surveys in the organization and methods of management of Northwest industrial concerns. Prerequisites, Bus. Adm. 89 and 130.

#### PSYCHOLOGY

See bulletin of the College of Science, Literature, and the Arts.

- Psy. 1-2. General Psychology.
- Psy. 56. Psychology of Advertising (Econ. 56).
- Psy. 125. Psychology of Individual Differences.

Psy. 130. Vocational Psychology.

Psy. 160. 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.

### PUBLIC UTILITIES

Bus. Adm. 71. Traffic Management. A survey of the rail, water, and highway transportation facilities, services, rates, and laws in their relation to business establishments; the executive's organization and management problems in handling freight, express, and mail shipments.

Bus. Adm. 72. Transportation Services. The scope, selection, and use of the facilities and services of common carriers; problems in handling railway, highway, waterway, and storage of freight, express, and mail. The private ownership of transportation facilities; the use of services of allied concerns.

Bus. Adm. 73. Transportation Charges. The principles, construction, interpretation, and use of rail, water, and highway classification, rates, and tariffs, for the handling of freight, express, and mail shipments. The audit of transportation charges and the adjustment of rates, rules, and regulations.

Bus. Adm. 74. Traffic Law. The legal basis of transportation law; the basic statutes; the regulation of rail, water, and highway common carriers by local, state, and national bodies; the position of the courts; procedure before government regulatory bodies; loss and damage cases.

Econ. 154. Public Utilities. A general survey of the economic characteristics and the legal position of public utilities. Special emphasis on methods of public regulation, valuation, and control of finances.

Econ. 159. The Law of Public Utilities (Pol. Sci. 111).

### REAL ESTATE

Bus. Adm. 152. Real Estate Valuation and Utilization. Factors affecting urban land utilization; urban land rent and value; methods of appraisal; special urban land problems.

Bus. Adm. 153. Real Estate Management and Practice. This course deals with the conduct of the real estate business. It includes a discussion of the practical problems involved in conducting appraisals, the negotiation of long-time leases, real estate finance, subdividing, and real estate brokerage. The materials are taken from the experience of men engaged in the real estate business who are co-operating in presenting these courses.

Econ. 170. Land Economics. Land as a factor in production; rural and urban utilization; rents and land values; land classification; land exchange; colonization.

## REPORT WRITING

Bus. Adm. 100. Report Writing. Lectures on sources 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.

## SECRETARIAL TRAINING

- Econ. 30-31. Secretarial Training: Shorthand. This course consists of a thoro study of the fundamental principles of shorthand, at the same time stressing the acquisition of a high rate of speed.
- Econ. 32-33-34. Secretarial Training: Typewriting. A thoro knowledge of typing technique is acquired and a study made of business forms.
- Econ. 40-41. Secretarial Training: Dictation I, II. Economics 30-31 required as a prerequisite. A dictation and transcription course involving the application of the knowledge acquired in the previous courses.
- Bus. Adm. 86. Office Organization and Management. The office as a producing unit: office organization, equipment, and layout; development of office standards and routines; relation of the office to operating divisions; scientific management of office work.
- Bus. Adm. 180-181E. (Fall and winter.) Senior Topics Course—Secretarial Practice. Business correspondence. A general survey of all forms of business correspondence with special emphasis on the business letter. Analysis and criticism of actual business letters and construction of single letters and series.

## STATISTICS

- Econ. 14. Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material.
- Bus. Adm. 112. Business Statistics. Survey and criticism of methods used in analyzing time series, with special applications to the study of cyclical fluctuations of economic phenomena.
- Econ. 113-114. Theory of Statistics. An advanced course in statistical analysis, covering averages, dispersion, simple and multiple correlation, and the theory of sampling. A brief consideration of the theory of index numbers.
- Bus. Adm. 180-181-182F. Senior Topics Course—Statistics. Reports will be prepared by each student on topics selected by them in consultation with the instructor. The studies will be designed to illustrate and make use of statistical methods in current use in the analysis of business problems.

*The Bulletin*  
*of the University of*  
**Minnesota**

*The School of Business Administration*  
*Part II*  
*Announcement of Program for the Year*  
*1929 -1930*



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## THE COURSES OF STUDY

### GENERAL REQUIREMENTS

To be eligible for admission to the School of Business Administration, the student must present ninety-three (93) credits earned in a recognized college or university with one honor point per credit, or a smaller number of credits to be determined as follows: For every five honor points in excess of one honor point per credit the number ninety-three (93) is diminished by one.

The credits for admission shall be earned in the following groups.

#### A. Required Credits:

1. Nine credits in Freshman Composition (Comp. 4-5-6) or exemption from requirement.
2. Ten credits in mathematics or *one* of the following laboratory sciences: botany, chemistry, physics, zoology.
3. Ten credits in *one* of the following social sciences: geography, history, political science, sociology.
4. Ten credits in the Principles of Economics. (This requirement may be satisfied by the completion of Economics 6 and 7 or the equivalent. The student will consult a pre-business adviser concerning an equivalent.)

#### B. Elective Credits:

Sufficient elective credits to complete the minimum number required for admission, (normally fifty-four (54) credits). The attention of the student is called to the two following groups of subjects to which part of the elective time should be devoted:

1. Courses required for graduation from the School of Business Administration and recommended for pre-business students. These courses are prerequisites for certain required courses in the School of Business Administration:

Economics 3, (Mechanism of Exchange)

Economics 14, (Elements of Statistics)

Economics 25-26, (Principles of Accounting)<sup>1</sup>

Students who do not elect the above courses during the freshman and sophomore years will be required to take Business Administration 57, 63, and 70, during the first quarter in residence in the School of Business Administration.

2. Courses required as prerequisites to courses in certain sequences in the School of Business Administration and recommended for all students:

a. Psychology 1-2, (General Psychology). This course is a prerequisite for courses in Advertising, Foreign Trade, Merchandising, Personnel Management, Insurance, and Real Estate.

b. Mathematics 8 or 47 and 20. (Commerce Algebra or Pre-Statistical Mathematics and Mathematics of Investment).

Required of students who take the Accounting, Insurance, or the Finance sequence.

In the School of Business Administration stress is laid upon the adaptation of the curriculum to the future plans of the individual. In order to make this aim effective each student is assigned to an adviser who makes a study of his needs and helps him to frame a program which will most nearly meet them.

<sup>1</sup> Students who have had a high school course or experience in bookkeeping will be admitted to Economics 25 upon passing a placement test. For other students Economics 20 is prerequisite to Economics 25.

In connection with some of the programs of study, provision has been made for employment with business concerns. The student is employed full time for one term in an accounting office, a bank, trust company, or other business institution. On completion of a satisfactory report concerning his work he may be granted a maximum of three credits. This work is organized for the purpose of providing proper laboratory facilities in business practice.

### THE CORE GROUP

The following courses constitute a core of material which should be covered by all students. In addition to these courses, there are certain required subjects in the various sequences. Unless an exception is specifically noted in connection with a sequence, all courses listed in this group will be required.

Exceptions may be made in individual cases upon petition approved by the adviser and the dean.

#### JUNIOR YEAR

	Credits
Business Law (Econ. 51, 52, 53).....	9
Monetary and Banking Policy (Econ. 141).....	3
Advanced General Accounting (B. A. 139).....	3
Corporation Finance (B. A. 155).....	3
Market Administration (B. A. 67).....	3
Traffic Management (B. A. 71).....	3
Business Statistics (B. A. 112).....	3
Report Writing (B. A. 190).....	1
	—
	28

#### SENIOR YEAR

	Credits
Advanced General Economics (B. A. 101-102).....	6
Business Policy (B. A. 109).....	3
Business Cycles (Econ. 149).....	3
Labor Problems (Econ. 161).....	3
Public Finance (B. A. 58).....	3
Public Utilities (Econ. 154).....	3
Production Management (B. A. 89).....	3
	—
	24

### I. The GENERAL COURSE IN BUSINESS

Advisers, Mr. Mudgett and Mr. Stead

The course is recommended to those persons who desire a well-balanced training in the important fields of business education, or for those who have not decided upon a specialized field of study. The sequence includes the courses required of all juniors and seniors in the School of Business Administration (see Core Group above) and, in addition, Geography 41, Geography of Commercial Production (to be taken preferably in the junior year) and Business Administration 130, Cost Accounting Survey.

A student taking his degree in the general business sequence has available a considerably wider range of electives than is the case in the special-



ized sequences given hereafter. These electives offer to the student the opportunity of pursuing an interest, in fields associated with his general training, in the social or natural sciences or in the arts. It is desirable that sufficient electives be taken in a given field to familiarize the student with something more than an introductory course. The following are suggested as fields for election and the courses within these fields may be arranged to meet the needs of individual students:

Anthropology	History
Botany	Journalism
Economics and Business Administration	Mathematics
English Literature, Composition, Speech	Philosophy
Geography	Political Science
Geology and Mineralogy	Psychology
Modern Foreign Languages	Sociology
	Zoology

## II. ACCOUNTING

Adviser, Mr. Heilman

The program in accounting is designed to meet the needs of those persons who are preparing for public accounting, the teaching of accounting, or for positions as accountants in financial or business establishments.

### JUNIOR YEAR

	Credits
Core group requirements .....	28
Cost accounting (B. A. 131-132).....	6
Accounting Practice and Procedure (B. A. 137-138).....	6
Electives .....	5
	—
	45

### SENIOR YEAR

	Credits
Core group requirements.....	24
Income Tax Accounting (B. A. 134).....	3
Auditing (B. A. 135).....	3
Senior Topics Course—Accounting (B. A. 181-182A).....	6
Electives .....	9
	—
	45

### RECOMMENDED ELECTIVES

	Credits
Senior Practice Course .....	3
Cost Accounting Systems .....	3
Auditing (B. A. 136).....	3
Finance Management .....	3
Personnel Administration .....	3
Commercial Policies .....	3
Fire and Marine Insurance .....	3
Casualty Insurance .....	3
Government and Business .....	3
Office Management .....	3
Investments .....	3
Theory of Statistics.....	6
Economic History .....	3 to 9

## III. ADVERTISING

Adviser, Mr. Vaile

The program in advertising is designed to prepare students for work either in advertising agencies or in advertising departments of merchandising establishments and of newspapers. Preliminary training is given in commercial art. Special emphasis is placed on the use of advertising in constructive merchandising.

## JUNIOR YEAR

	Credits
Core group requirements .....	28
Psychology of Advertising (Psy. 56).....	3
Advertising (B. A. 88).....	3
Reporting (Jour. 13) <sup>1</sup> .....	3
Introduction to Principles of Copy Editing (Jour. 41).....	3
Writing of Special Articles (Jour. 69).....	3
Electives .....	2
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	24
Graphic Arts (B. A. 64-65-66).....	6
Advanced Advertising Procedure (B. A. 194-195-196).....	3
Senior Topics—Marketing (B. A. 182C).....	3
Electives .....	9
	—
	45

RECOMMENDED ELECTIVES<sup>2</sup>

	Credits
Types of Writing .....	6
Social Psychology .....	3
Freehand Drawing .....	2
Principles of Harmony in Form and Color.....	3
Sales Management .....	3
Public Speaking .....	6

## IV. AGRICULTURAL BUSINESS

Adviser, Mr. Price

This line of specialization is intended for students who wish to prepare for some branch of business which relates to agriculture, such as the marketing of farm products, farm finance, farm implements, farm real estate, country merchandising, and the like. The student should also take

<sup>1</sup> To be taken in the sophomore year when possible.

<sup>2</sup> Permission may be obtained by individual students to substitute one from this list of electives for Production Management in the core group.

supplementary courses in technical agriculture. It is recommended that as many as possible of these be taken during the pre-business years. During the junior and senior years students in this sequence are registered jointly in the College of Agriculture, Forestry, and Home Economics and the School of Business Administration. One hundred ninety-two credits are required for graduation from this course.

#### JUNIOR YEAR

Substitutions may be made for Corporation Finance (B. A. 155), Market Administration (B. A. 67), and Business Statistics (B. A. 112) in the core group requirements for students in this sequence.

	Credits
Core group requirements .....	19
Economics of Agricultural Production (Ag. Econ. 110-111) ..	6
Principles of Marketing Organization (Ag. Econ. 40-141-142) ..	8
Prices of Farm Products (Ag. Econ. 30) .....	3
Market Prices (Ag. Econ. 131) .....	3
Elective .....	6
	—
	45

#### SENIOR YEAR

Substitutions may be made for Business Policy (B. A. 109), Labor Problems (Econ. 161), Production Management (B. A. 89), and Public Utilities (Econ. 154) in the core group requirements for students in this sequence.

	Credits
Core group requirements .....	12
Agricultural Statistics (Ag. Econ. 90) .....	5
Advanced Agricultural Statistics (Ag. Econ. 191) .....	3
Methods of Price Analysis (Ag. Econ. 135) .....	3
Advanced Farm Finance (Econ. 150) .....	3
Land Economics (Econ. 170) .....	3
Electives .....	16
	—
	45

#### RECOMMENDED ELECTIVES

##### *A. Economics*

	Credits
Business Statistics .....	3
Corporation Finance .....	3
Commercial Policies .....	3
Co-operative Organization .....	3
Business Policy .....	3
Labor Problems .....	3
Farm Management Organization .....	3
Farm Management Operation .....	3

*B. Agriculture*

The following courses are suggested for students who wish to prepare for business related to certain aspects of agriculture. Students interested in other specializations should consult their adviser.

1. Dairy Products
  - Agricultural Biochemistry
  - General Bacteriology
  - Dairy Bacteriology
  - Dairy Products
  - Market Milk
2. Grain and Hay
  - Forage Crops
  - Grain Crops
  - Grain and Hay Grading
3. Seeds. These courses are in addition to those under 2.
  - Principles of Genetics
  - Farm Crops
  - Special Crops
  - Plant Breeding
4. Agricultural Implements
  - General Physics
  - Agricultural Physics
  - Farm Machinery
  - Mechanical Training
  - Auto and Tractor

## V. FINANCE

Adviser, Mr. Stehman

This program of courses is designed to meet the needs of persons who will ultimately secure connections with financial institutions such as banks and bond houses or with the financial departments of other concerns.

## JUNIOR YEAR

	Credits
Core group requirements .....	28
Electives .....	17
	—
	45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Finance Management (B. A. 156).....	3
Bank Administration (B. A. 147).....	3
Investments (B. A. 146).....	3
Foreign Exchange (B. A. 145).....	3
Senior Topics Course—Finance (B. A. 180-181-182B).....	6
Comparative Banking—British Systems (Econ. 124).....	3
	—
	45

## RECOMMENDED ELECTIVES

	Credits
Economic History .....	3 to 6
Advanced Farm Finance .....	3
Comparative Banking—European Systems .....	3
Comparative Banking—South American Systems.....	3
Cost Accounting Survey .....	3
State and Local Taxation.....	3
Commercial Policies .....	3
Geography .....	5 to 9
Life Insurance .....	3
Personnel Administration .....	3
Real Estate Valuation and Land Utilization.....	3
Accounting Practice and Procedure.....	6
Fire and Marine Insurance.....	3
Casualty Insurance .....	3

## VI. FOREIGN TRADE

Adviser, Mr. Blakey

This sequence is designed for persons who plan to associate themselves with exporting houses or with export departments of large manufacturing and mercantile establishments.

## JUNIOR YEAR

	Credits
Core group requirements .....	28
Geography of Commercial Production (Geog. 41).....	5
Foreign Exchange (B. A. 145).....	3
Advertising (B. A. 88).....	3
Electives .....	6
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	24
Commercial Policies (Econ. 176).....	3
Foreign Trade (B. A. 177).....	3
International Law (Pol. Sci. 121-122).....	6
Electives .....	9
	—
	45

## RECOMMENDED ELECTIVES

	Credits
A senior topics course .....	4 to 9
Finance Management .....	3
Economic History .....	3 to 6
Foreign Languages .....	3
Comparative European Government .....	5
Personnel Administration .....	3
Advanced Personnel Administration .....	3
Economics of Agricultural Production.....	3
Fire and Marine Insurance.....	3
Advanced English Composition .....	9
Transportation Charges .....	3
Transportation Law .....	3

VII. PERSONNEL MANAGEMENT

Adviser, Mr. Stead

This program offers basic training to (1) prospective workers in personnel departments of business establishments, and (2) to persons who expect to participate in the adjustment of matters pertaining to the employment of labor.

JUNIOR YEAR

	Credits
Core group requirements .....	28
Labor Movements (Econ 162).....	3
Personnel Administration (B. A. 167).....	3
Advanced Personnel Administration (B. A. 168).....	3
Electives .....	8
	—
	45

SENIOR YEAR

	Credits
Core group requirements .....	24
Labor Legislation and Social Insurance (Econ. 164).....	3
Psychology in Personnel Work (Psy. 60).....	3
Vocational Psychology (Psy. 130).....	2
Senior Topics Course—Personnel (B. A. 180-181-182D).....	9
Electives .....	4
	—
	45

RECOMMENDED ELECTIVES

	Credits
Casualty Insurance .....	3
Introduction to Administration .....	3
Principles of Public Administration .....	3
Economic History .....	3 to 6
Introduction to Anthropology .....	5
Introduction to Sociology .....	5
Advanced English Composition .....	9
Psychology of Individual Differences.....	6
Theory of Statistics .....	6
Office Management .....	3

VIII. MERCHANDISING

Adviser, Mr. Vaile

The electives in this program may be so chosen as to prepare the student for work in the merchandising department either of manufacturing, wholesaling, or retailing establishments.

JUNIOR YEAR

	Credits
Core group requirements .....	28
Psychology of Advertising (Psy. 56).....	3
Advertising (B. A. 88).....	3
One of the following:	
Sales Management (B. A. 68).....	}
Retailing (B. A. 69).....	}
Marketing Farm Products (Econ. 108).....	}
Electives .....	8
	—
	45

## SCHOOL OF BUSINESS ADMINISTRATION

## SENIOR YEAR

	Credits
Core group requirements .....	24
Senior Topics Course—Marketing (B. A. 180-181C).....	6
Transportation Charges (B. A. 73).....	3
Electives .....	12
	—
	45

## RECOMMENDED ELECTIVES

	Credits
Senior Topics Course—Marketing (B. A. 182C).....	3
Types of Writing .....	6
Geography of Commercial Production.....	5
Foreign Trade .....	3
Transportation Services .....	3
Textiles .....	3
Personnel Administration .....	3
Government and Business .....	3
Fire and Marine Insurance.....	3

## IX. REAL ESTATE

Adviser, Mr. Stevenson

This sequence is designed particularly for those students who are interested in real estate practice. Its object is to prepare those expecting to enter general real estate offices or to become connected with financial organizations such as building and loan associations and mortgage companies.

## JUNIOR YEAR

Real Estate Law is substituted for Pol. Sci. 53, Business Law, in this sequence.

	Credits
Core group requirements .....	25
Psychology of Advertising (Psy. 56).....	3
Advertising (B. A. 88).....	3
Fire and Marine Insurance (B. A. 60).....	3
Economic Aspects of Population and Immigration (Econ. 163).....	3
Real Estate Valuation and Land Utilization (B. A. 152).....	3
Electives .....	5
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	24
State and Local Taxation (Econ. 193).....	3
City Planning (Mun. and San. Eng. 272).....	3
Building Construction (Arch. 51, 52, 53).....	6
Real Estate Management and Practice (B. A. 153).....	3
Real Estate Law (Bus. Law D).....	3
Electives .....	3
	—
	45

## COURSES OF STUDY

II

### RECOMMENDED ELECTIVES

	Credits
Investments .....	3
Municipal Powers .....	6
Recent Social Legislation .....	3
Theory of Statistics .....	6
Commercial Policies .....	3
Economic History .....	9

### X. SECRETARIAL

Adviser, Miss Donaldson

The courses offered in this program are arranged for the training of secretaries and assistants. The student should select, with the help of his adviser, the courses which will best prepare him for the special type of secretarial work he expects to enter. Among the positions for which he may prepare are the following: office manager and assistant; private secretary to persons engaged in educational, social, philanthropic, scientific, medical, legal, religious, literary, professional, or mercantile work; secretary in schools and institutions; business correspondent; registrar; civil service.

#### JUNIOR YEAR

	Credits
Core group requirements .....	28
Types of Writing (Comp. 18-19) .....	6
Secretarial Training—Dictation (Econ. 40-41-42) .....	9
Elective .....	2
	—
	45

#### SENIOR YEAR

	Credits
Core group requirements .....	24
Office Organization and Management (B. A. 86) .....	3
Senior Topics Course—Secretarial (B. A. 180-181E) .....	6
Electives .....	12
	—
	45

### RECOMMENDED ELECTIVES

	Credits
Life Insurance .....	3
Casualty Insurance .....	3
Advertising .....	3
Investments .....	3
Economic History .....	3 to 6
Cost Accounting .....	3
Accounting Practice and Procedure .....	6
Personnel Administration .....	3
Commercial Policies .....	3
Geography of Commercial Production .....	5
American Government .....	5
Government and Business .....	3
Public Speaking .....	5 to 10



## XI. INDUSTRIAL ADMINISTRATION

Adviser, Mr. O'Hara

The course follows the two-year pre-business course given in the College of Engineering and Architecture. The program is designed primarily for students who expect to engage in purchasing, sales, employment, production, control or cost accounting work in manufacturing establishments.

## JUNIOR YEAR

Substitution may be made for Business Statistics (B. A. 112) in this sequence.

	Credits
Core group requirements.....	25
Strength of Materials (M. & M. 85).....	4
Principles of Accounting (Econ. 26).....	3
Electives .....	13
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	24
Cost Accounting Survey (B. A. 130).....	3
Personnel Administration (B. A. 167).....	3
Senior Topics Course—Production Management (B. A. 180-181G) .....	6
Electives .....	9
	—
	45

## RECOMMENDED ELECTIVES

The students may divide the time available for electives between Groups A and B.

*A. General and Business*

	Credits
Economic History .....	3 to 6
Finance Management .....	3
Theory of Statistics .....	6
Geography of Commercial Production.....	5
Law of Public Utilities .....	3
Casualty Insurance .....	3
Fire and Marine Insurance.....	3

*B. Engineering*

	Credits
Gas Manufacture and Distribution.....	3
Municipal Engineering .....	3
Contracts and Specifications .....	3
Estimating .....	3
Technical Writing .....	3

## XII. STATISTICS

Adviser, Mr. Mudgett

This sequence is designed for students who intend to become statisticians for business firms or associations. The student will be required to take the core courses required of all juniors and seniors in the School of Business Administration with the exception of Labor Problems (Econ. 161), Production Management (B. A. 89), and Traffic Management (B. A. 71), for which suitable courses in mathematics may be substituted. The statistics sequence therefore shall include the following:

## JUNIOR YEAR

	Credits
Core group requirements .....	25
Theory of Statistics (Econ. 113, 114).....	6
Pre-Statistical Mathematics (Math. 47-48-49).....	12
Electives .....	2
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	18
Senior Topics Course—Statistics (B. A. 180-181-182F).....	9
Investments (B. A. 146).....	3
Cost Accounting (B. A. 130).....	3
Securities Market (B. A. 148).....	3
Electives .....	9
	—
	45

## RECOMMENDED ELECTIVES

	Credits
Logic .....	5
Theory of Statistics (Mathematics Department).....	3
Personnel Administration .....	3
Foreign Exchange .....	3
History of Economics Ideas .....	3

## XIII. TRAFFIC AND TRANSPORTATION

Adviser, Mr. Butterbaugh

This sequence is designed for those persons who wish to prepare for traffic work with shippers and carriers. A sufficient number of general courses are included to meet the needs of those who expect to obtain executive positions involving only an incidental amount of traffic work.

## JUNIOR YEAR

	Credits
Core group requirements .....	28
Geography of Commercial Production (Geog. 41).....	5
Trade Routes and Trade Centers (Geog. 102).....	3
Foreign Trade (B. A. 177).....	3
Sales Management (B. A. 68).....	3
Transportation Services (B. A. 72).....	3
	—
	45

## SENIOR YEAR

	Credits
Core group requirements .....	24
Transportation Charges (B. A. 73).....	3
Traffic Law (B. A. 74).....	3
Cost Accounting Survey (B. A. 130).....	3
Fire and Marine Insurance (B. A. 60).....	3
Law of Public Utilities (Pol. Sci. 159).....	3
Electives .....	6

45

## RECOMMENDED ELECTIVES

	Credits
Office Management (B. A. 86).....	3
Personnel Administration (B. A. 167).....	3

XIV. INSURANCE<sup>1</sup>

Adviser, Mr. Graves

This sequence is recommended to those who expect to enter one of the several branches of the insurance business or who plan to associate themselves with insurance departments of banking, commercial, or industrial organizations. The courses offered provide adequate academic preparation for those who plan to take the examinations for the degree of Chartered Life Underwriter, which is granted to those who satisfy the requirements of the American College of Life Underwriters.

## JUNIOR YEAR

	Credits
Core group requirements.....	28
Life Insurance (B. A. 59).....	3
Fire and Marine Insurance (B. A. 60).....	3
Advertising (B. A. 88).....	3
Psychology of Advertising (Econ. 56).....	3
Electives .....	5

45

## SENIOR YEAR

	Credits
Core group requirements.....	24
Casualty Insurance (B. A. 61).....	3
Investments (B. A. 146).....	3
The Securities Market (B. A. 148).....	3
Elements of the Mathematics of Life Insurance (Econ. 21).....	3
Senior Topics Course: Insurance (B. A. 180H).....	3
Electives .....	6

45

## RECOMMENDED ELECTIVES

	Credits
Social Psychology .....	3
Sales Management .....	3
State and Local Taxation .....	3
Economic History .....	6
Government and Business.....	3
Real Estate Valuation and Land Utilization.....	3
Personnel Administration .....	3
Introduction to Sociology .....	5
Recent Social Legislation.....	3

<sup>1</sup> Mathematics 8 or 47 and 20 are required of students pursuing this sequence.

**PROGRAM\***  
**ECONOMICS**

No.	Title	Hour	Day	Bldg.	Instructor
1f	Business Organization: Marketing.... (5 cred.; fr. only; no prereq.)				
	Lect.	IV	TS	150Ph	Mr. Vaile
	Div. I	IV	MWF	206OLa	and others
	Div. II Sec. 1	I	MWF	109B	
	2	I	MWF	110P	
	3	II	MWF	110P	
	4	II	TThS	109B	
	5	III	TThS	102B	
	6	III	TThS	109B	
	7	V	MWF	109B	
	8	VI	MWF	109B	
	9	VII	MWF	109B	
	10	VIII	MWF	109B	
1w	Business Organization: Marketing... (See 1f)				
	Lect.	IV	TS	202B	Mr. Vaile
	Sec. 1	I	MWF	303B	and others
	2	III	TThS	303B	
	3	V	MWF	303B	
	4	VI	MWF	209B	
1s	Business Organization: Marketing.... (See 1f)				
	Lect.	IV	TS	202B	Mr. Vaile
	Sec. 1	II	TThS	209B	and others
	2	IV	MWF	303B	
2f	Business Organization: Production... (5 cred.; fr. only; no prereq.)				
	Lect.	III	Th	303B	Mr. Black
	Sec. 1	III	MWFS	3F	and others
	2	V	MTWF	6B	
2w	Business Organization: Production... (See 2f)				
	Lect.	IV	T	150Ph	
	Sec. 1	I	MWFS	209OL	
	2	I	MWFS	206P	
	3	II	MWFS	102F	
	4	II	MWFS	5F	
	5	III	MWFS	206P	
	6	IV	MWFS	206P	
	7	V	MTWF	109B	
	8	VI	MWThF	5F	
	9	VII	MWThF	5F	
	10	VIII	MWThF	5F	

\* Each course has in parentheses an abbreviated statement of credits and prerequisites. Thus (5 cred.; jr., sr., grad.; prereq., 3-4) means that the course carries 5 credits, is offered to juniors, seniors, and graduates, and demands Course 3-4 in the same department as a prerequisite.

## SCHOOL OF BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
2s	Business Organization: Production... (See 2w)				
	Lect.	III	W	OPhAud	Mr. Black
	Sec. 1	II	MWFS	2F	and others
	2	III	TThFS	4AOPh	
	3	V	MTWF	6B	
	4	VII	MWThF	6B	
3f	The Mechanism of Exchange..... (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)				Mr. Stehman and others
	Lect.	III	TTh	301F	
	Sec. 1	I	TThS	202B	
	2	III	MWF	109B	
	3	VI	MWF	102B	
3w	The Mechanism of Exchange..... (See 3f)				Mr. Stehman and others
	Lect.	III	TTh	301F	
	Sec. 1	I	TThS	303B	
	2	II	MWF	109B	
	3	V	MWF	6B	
	4	VI	MWF	4AOPh	
3s	The Mechanism of Exchange..... (See 3f)				Mr. Stehman and others
	Lect.	III	TTh	OLAud	
	Sec. 1	I	MWF	303B	
	2	I	MWF	209B	
	3	II	MWF	209OL	
	4	II	TThS	202B	
	5	III	MWF	221OL	
	6	IV	MWF	104OPh	
	7	IV	MWF	4AOPh	
	8	V	MWF	202B	
	9	V	MWF	303B	
	10	VI	MWF	209B	
	11	VI	MWF	102B	
	12	VII	MWF	303B	
	13	VII	MWF	2COPh	
	14	VIII	MWF	109B	
4f	Principles of Economics..... (5 cred.; soph.; prereq., 1, 2 and 3)				Mr. Hansen and others
	Lect.	II	Th	OPhAud	
	Sec. 1	I	TThFS	9F	
	2	II	MWFS	5F	
	3	III	TThFS	6F	
	4	IV	MWFS	104OPh	
	5	V	MTWF	209B	
	6	VII	MWThF	102B	
	7	VIII	MWThF	209B	
4w	Principles of Economics..... (See 4f)				Mr. Hansen and others
	Lect.	IV	T	303B	
	Sec. 1	II	MWFS	205F	
	2	III	TThFS	6B	

PROGRAM

No.	Title	Hour	Day	Bldg.	Instructor
4s	Principles of Economics..... (See 4f)				Mr. Hansen and others
	Lect.	II	Th	301F	
	Sec. 1	II	MWFS	5F	
	2	IV	MWFS	111OL	
	3	V	MTWF	102B	
	4	VI	MWThF	104OPh	
6f-7w†	Principles of Economics — General Course ..... (10 cred.; soph., jr., sr.; no prereq.; not open to students who have re- ceived credit in Econ. 4)				Mr. Hansen and others
	Lect.	III	W	OPhAud	
	Sec. 1	I	TThFS	5F	
	2	II	MWFS	4AOPh	
	3	IV	MWFS	5F	
	4	V	MTWF	102B	
	5	VI	MWThF	6B	
	6	VI	MWThF	104F (fall only)	
	7	VII	MWThF	6B	
6w-7s†	Principles of Economics — General Course ..... (See 6f-7w)				Mr. Hansen and others
	Lect.	II	T	OPhAud	
	Sec. 1	I	TThFS	6B(w) 9F(s)	
	2	II	MWFS	303B(w) 25F(s)	
	3	IV	MWFS	6B	
	4	V	MTWF	209B	
6s†	Principles of Economics — General Course ..... (1st qtr. of 6-7. See 6f-7w)				Mr. Hansen and others
	Lect.	III	W	206OLa	
	Sec. 1	II	MWFS	200OLa	
	2	V	MTWF	109B	
	3	VI	MWThF	109B	
	4	VII	MWThF	6B	
7ft	Principles of Economics — General Course ..... (2nd qtr. of 6-7. See 6f-7w)				Mr. Hansen and others
	Lect.	IV	T	206OLa	
	Sec. 1	II	MWFS	206P	
	2	IV	MWFS	6B	
	3	V	MTWF	202B	
14f	Elements of Statistics..... (5 cred.; soph., jr., sr.; prereq., 4 or 6-7)				Mr. Mudgett and others
	Sec. 1	I	MWThFS	6B	
	2	II	MWThFS	303B	
	3	IV	MTWFS	302B	
	4	VI	MTWThF	303B	
14w	Elements of Statistics..... (See 14f)				Mr. Mudgett and others
	Sec. 1	III	MTWFS	109B	
	2	IV	MTWFS	302B	
	3	VI	MTWThF	109B	
	4	VII	MTWThF	301B	

† The entire course must be completed before credit is received for any quarter.

## SCHOOL OF BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
14s	Elements of Statistics..... (See 14f)				Mr. Mudgett and others
	Sec. 1	I	MWThFS	6B	
	2	II	MWThFS	109B	
	3	III	MTThFS	6B	
	4	IV	MTWFS	301B	
	5	VI	MTWThF	301B	
	6	VII	MTWThF	301B	
20f*	Elements of Accounting..... (3 cred.; 3rd qtr. fr., soph.; no prereq.)				Mr. Heilman and others
	Sec. 1	I	MWF	303B	
	2	II	TThS	6B	
	3	III	TThS	301B	
	4	IV	MWF	301B	
	5	VI	MWF	301B	
20w*	Elements of Accounting..... (See 20f)				Mr. Heilman and others
	Sec. 1	III	TThS	302B	
	2	III	MWF	302B	
	3	VI	MWF	301B	
20s*	Elements of Accounting..... (See 20f)				Mr. Heilman and others
	Sec. 1	I	MWF	301B	
	2	I	TThS	301B	
	3	II	MWF	301B	
	4	III	TThS	302B	
	5	IV	MWF	302B	
	6	V	MWF	302B	
	7	VI	MWF	302B	
	8	VII	MWF	302B	
21s	Elements of the Mathematics of Life Insurance .....	See Mathematics 21			
25f-26w††	Principles of Accounting..... (6 cred.; soph., jr., sr.; prereq., 20)				Mr. Heilman and others
	Sec. 1	I	TThS	302B (fall only)	
	2	I	MWF	301B	
	3	I	TThS	301B	
	4	II	MWF	301B	
	5	VI	MWF	302B	
	6	VII	MWF	302B	
25w-26s††	Principles of Accounting..... (See 25f-26w)				Mr. Heilman and others
	Sec. 1	I	TThS	302B	
	2	II	MWF	302B	
	3	III	MWF	301B	
	4	IV	MWF	301B (winter only)	
	5	VI	MWF	303B	

\* Students who have had high school training or other experience in bookkeeping and who pass the placement test may be exempt from this course and admitted to Economics 25.

† The entire course must be completed before credit is received for any quarter.

‡ Open to pre-business students only.

PROGRAM

No.	Title	Hour	Day	Bldg.	Instructor
.25s†‡	Principles of Accounting..... (1st qtr. of 25-26. See 25f-26w) Sec. 1	II	MWF	303B	Mr. Heilman and others
	2	III	TThS	303B	
.26f†‡	Principles of Accounting..... (2nd qtr. of 25-26. See 25f-26w)	III	MWF	301B	Mr. Heilman and others
.32f§-33w- 34s*†	Secretarial Training: Typewriting... (3 cred.; 3rd qtr. fr., soph., jr.; no prereq.)	III V	TThS MW	1B	Miss Donaldson
.32s*§	Secretarial Training: Typewriting... (1st qtr. of 32-33-34. See 32f-33w- 34s)	IV	MTWFS	1B	Miss Donaldson
.33f-34w*†	Secretarial Training: Typewriting... (2nd and 3rd qtrs. of 32-33-34. See 32f-33w-34s)	I	MTWThF	1B	Miss Donaldson
.34f*	Secretarial Training: Typewriting... (3rd qtr. of 32-33-34. See 32f-33w- 34s)	VI	MTWThF	1B	Miss Donaldson
.35f	Introduction to Reporting.....	See Journalism	13		
.36f	Principles of Copy Editing.....	See Journalism	41		
.37f*	Secretarial Training: Elementary Shorthand .....				Miss Donaldson
	(3 cred.; soph., jr.; prereq., 32) Rec. Sec. 1	II	MWF	1B	
	(For pre-commercial education stu- dents only)				
	Sec. 2	III	MWF	1B	
	(For pre-secretarial students only)				
	Lab.	II	TThS	1B	
	(For both sections above)				
.38w-39s*†	Secretarial Training: Shorthand..... (6 cred.; soph., jr.; prereq., 37) Rec.	II	MWF	1B	Miss Donaldson
	Lab.	II	TThS	1B	
.40f-41w- 42s*†	Secretarial Training: Dictation..... (9 cred.; soph., jr., sr.; prereq., 39) Rec.	I	MWF	104B	Miss Donaldson
	Lab.	VII	TThF	1B	
.50s	The Writing of Special Articles.....	See Journalism	69		
.51f-52w-53s	Business Law .....	See Political Science	51-52-53		
.56w	Psychology of Advertising.....	See Psychology	56		
.75f,w,s	Geography of Commercial Production	See Geography	41		
.80f-81w	Introduction to Economic History....	See History	80-81		
.82f-83w-84s	Economic History of the United States .....	See History	82-83-84		
.105s	History of Economic Ideas—The Clas- sical Economists .....	Not offered in 1929-30			
	(3 cred.; jr., sr., grad.; prereq., 101- 102 or 103-104 or consent of in- structor)				

\* Open for credit to pre-secretarial and pre-commercial education students only.

† The entire course must be completed before credit is received for any quarter.

‡ Open to pre-business students only.

§ Students may be exempt from this course and admitted to 33 by passing a placement test.



## SCHOOL OF BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
106S	History of Economic Ideas—The Critics of the Classical Economists (3 cred.; jr., sr., grad.; prereq., 101-102 or 103-104 or consent of instructor)	VII	MWF	102B	Mr. Hansen
108W	Marketing Organization: Agricultural Products ..... (3 cred.; jr., sr., grad.; prereq., 85 or 67; not open to agr. bus. students)	VIII	MWF	109B	Mr. Price
110f-111W	Economics of Agricultural Production	See Agricultural Economics 110-111			
113W-114S	Theory of Statistics..... (6 cred.; jr., sr., grad.; prereq., 14)	I	MWF	102B	Mr. Mudgett
118f-119W-120S	Economic History of Europe 1750 to the Present .....	See History 113-114-115			
121f-122W-123S	Economic History of Europe 1300-1750	See History 116-117-118			
124f	Comparative Banking—British Systems ..... (3 cred.; jr., sr., grad.; prereq., 141)	III	MWF	104B	Mr. Myers
125W	Comparative Banking—European Systems ..... (3 cred.; jr., sr., grad.; prereq., 141)	III	MWF	104B	Mr. Myers
126S	Economics of Consumption.....	See Agricultural Economics 126			
127S	Comparative Banking—South American Systems ..... (3 cred.; jr., sr., grad.; prereq., 141)	II	MWF	104B	Mr. Myers
141f	Monetary and Banking Policy..... (3 cred.; jr., sr., grad.; prereq., 3, and 4 or 6-7)				Mr. Marget and others
	Sec. 1	I	MWF	102B	
	2	III	TThS	209B	
	3	IV	MWF	209B	
	4	VI	MWF	209B	
141W	Monetary and Banking Policy..... (See 141f)				Mr. Marget and others
	Sec. 1	I	MWF	209B	
	2	II	TThS	6B	
	3	IV	MWF	209B	
141S	Monetary and Banking Policy..... (See 141f)				Mr. Marget and others
	Sec. 1	III	MWF	209B	
	2	VII	MWF	209B	
149f	Business Cycles ..... (3 cred.; sr., grad.; prereq., 3, and 4 or 6-7)	VIII	MWF	202B	Mr. Myers
149W	Business Cycles ..... (See 149f)				
	Sec. 1	I	MWF	109B	Mr. Marget
	2	VIII	MWF	102B	Mr. Myers
149S	Business Cycles ..... (See 149f)	III	MWF	102B	Mr. Myers
151f	Prices of Farm Products.....	See Agricultural Economics 130			

PROGRAM

No.	Title	Hour	Day	Bldg.	Instructor
154s*	Public Utilities .....	III	TThS	102B	Mr. Garver
	(3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. incl. 4 or 6-7)				
157f	Recent Social Legislation .....	See	Political Science	107	
158s	Government and Business.....	See	Political Science	109	
159w	The Law of Public Utilities.....	See	Political Science	111	
161f	Labor Problems and Trade Unionism. (3 cred.; jr., sr., grad.; prereq., 4 or 6-7)	IV	MWF	202B	Mr. Hansen
161w	Labor Problems and Trade Unionism. (See 161f)	III	TThS	202B	Mr. Hansen
161s	Labor Problems and Trade Unionism (See 161f)	III	TThS	202B	Mr. Hansen
162w	Labor Movements .....	IV	MWF	202B	Mr. Hansen
	(3 cred.; jr., sr., grad.; prereq., 161)				
163s	Economic Aspects of Population and Immigration .....	IV	MWF	202B	Mr. Hansen
	(3 cred.; jr., sr., grad.; prereq., 4 or 6-7)				
164s	Labor Legislation and Social Insurance .....	III	TThS	209B	Mr. Stead
	(3 cred.; jr., sr., grad.; prereq., 161)				
166w	Contemporary Economic Problems... (3 cred.; jr., sr., grad.; prereq., 4 or 6-7)	VII	MWF	102B	Mr. Hansen
170s	Land Economics .....	VII-VIII½	TTh	302HH (Farm)	Mr. Black
	(3 cred.; jr., sr., grad.; prereq., 4 or 6-7)				
171s	Land Tenure .....	See	Agricultural Economics	171	
175s	Topics in Economic History.....	See	History	169	
176f	Commercial Policies .....	I	MWF	202B	Mr. Blakey
	(3 cred.; jr., sr., grad.; prereq., 4 or 6-7)				
176s	Commercial Policies .....	I	MWF	202B	Mr. Blakey
	(See 176f)				
191f-192w§†	Public Finance .....	III	MWF	209B	Mr. Blakey
	(6 cred.; jr., sr., grad.; prereq., 3, 4 or 6-7)				
193s	State and Local Taxation..... (3 cred.; jr., sr., grad.; prereq., 191-192)	III	MWF	104B	Mr. Blakey

BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
57ft	Money and Banking .....	III	MTThFS	6B	Mr. Stehman
	(5 cred.; jr., sr.; no prereq.)				
58f§	Elements of Public Finance..... (3 cred.; jr., sr.; prereq., 4 or 6-7)	IV	MWF	102B	Mr. Blakey
58s§	Elements of Public Finance..... (See 58f)	IV	MWF	102B	Mr. Blakey

\* Not open to Business Administration students.

† The entire course must be completed before credit is received for any quarter.

‡ Credit may not be received for both Economics 3 and B. A. 57.

§ Credit may not be received for both Economics 191-192 and B. A. 58.

## SCHOOL OF BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
59f	Life Insurance .....	II	TThS	102B	Mr. Graves
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
60w	Fire and Marine Insurance.....	II	TThS	102B	Mr. Graves
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
61s	Casualty Insurance .....	II	TThS	102B	Mr. Graves
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
63f	Accounting—Combined Course.....	II	MTWThFS	302B	Mr. Heilman
	(6 cred.; jr., sr.; prereq., 20)				
64f-65w-66s	Graphic Arts .....	IV	MW	5E	Mr. Kirchner
	(6 cred.; jr., sr., grad.; prereq., 15 cred. in econ.)				
67f	Market Administration .....	I	TThS	109B	Mr. Wagner
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
67w	Market Administration .....	I	TThS	209B	Mr. Wagner
	(See 67f)				
67s	Market Administration .....	I	TThS	202B	Mr. Wagner
	(See 67f)				
68w	Sales Management .....	II	TThS	109B	Mr. Wagner
	(3 cred.; jr., sr.; prereq., 67)				
69	Retail Store Management.....	Not offered in 1929-30.			
	(3 cred.; jr., sr.; prereq., 67)				
70f*	Statistics Survey Course.....	I	MTWThF	209B	Mr. Mudgett
	(5 cred.; jr., sr.; prereq., 4 or 6-7)				
71f	Traffic Management .....	VI	MWF	202B	Mr. Butterbaugh
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
71w	Traffic Management .....	VI	MWF	202B	Mr. Butterbaugh
	(See 71f)				
71s	Traffic Management .....	VI	MWF	202B	Mr. Butterbaugh
	(See 71f)				
72f	Transportation Services .....	VII	MWF	202B	Mr. Butterbaugh
	(3 cred.; jr., sr.; prereq., 71)				
73w	Transportation Charges .....	VII	MWF	202B	Mr. Butterbaugh
	(3 cred.; jr., sr.; prereq., 71)				
74s	Traffic Law .....	VII	MWF	109B	Mr. Butterbaugh
	(3 cred.; jr., sr.; prereq., 71)				
86s	Office Organization and Management	IV	MWF	209B	Mr. O'Hara
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
88s	Advertising .....	II	MWF	209B	Mr. Vaile
	(3 cred.; jr., sr.; prereq., 67, Psy. 56)				
89f	Production Management .....	II	MWF	209B	Mr. O'Hara
	(3 cred.; jr., sr.; prereq., 4 or 6-7)				
89w	Production Management .....	II	MWF	202B	Mr. O'Hara
	(See 89f)				
89s	Production Management .....	I	MWF	109B	Mr. O'Hara
	(See 89f)				
100f,w	Report Writing .....	VI	T	209B	Mr. Heilman
	(1 cred.; jr., sr.)				
100s	Report Writing .....	I	T	102B	Mr. Heilman and others
	(See 100f,w)				
101f-102w††	Advanced General Economics.....				Mr. Garver
	(6 cred.; sr.; prereq., 4 or 6-7)				
	Sec. 1	II	TThS	209B	
	2	III	MWF	202B	

\* Credit may not be received for both Economics 14 and B. A. 70.

† The entire course must be completed before credit is received for any quarter.

†† Credit may not be received for both B. A. 101-102 and B. A. 107.

|| Credit may not be received for both Economics 25-26 and B. A. 63.

PROGRAM

No.	Title	Hour	Day	Bldg.	Instructor
101w-102s†‡	Advanced General Economics..... (See 101f-102w)	I	TThS	109B	Mr. Garver.
107f‡	Advanced General Economics—Com- bined Course .....	II	MTWThF	202B	Mr. Garver
	(5 cred.; sr.; prereq., 4 or 6-7)				
109f	Business Policy.....	VII	MWF	202B	Mr. Stevenson
	(3 cred.; sr., grad.; prereq., 101-102)				
100w	Business Policy .....	VII	MWF	109B	Mr. Stevenson
	(See 109f)				
109s	Business Policy .....	II	MWF	6B	Mr. Stevenson
	(See 109f)				
112f	Business Statistics .....	II	MWF	102, 109B	Mr. Mudgett
	(3 cred.; jr., sr., grad.; prereq., 14)				
112w	Business Statistics .....	II	MWF	102B	Mr. Mudgett
	(See 112f)				
112s	Business Statistics .....	II	MWF	102B	Mr. Mudgett
	(See 112f)				
130f	Cost Accounting (General Survey)...	I	TThS	303B	Mr. Ostlund
	(3 cred.; jr., sr., grad.; prereq., 25-26)				
130s	Cost Accounting (General Survey)..	I	TThS	303B	Mr. Ostlund
	(See 130f)				
131f-132w†	Cost Accounting .....	II	TThS	301B	Mr. Ostlund
	(6 cred.; jr., sr., grad.; prereq., 25-26)				
133s	Cost Accounting Systems.....	II	TThS	301B	Mr. Ostlund
	(3 cred.; jr., sr., grad.; prereq., 131 or 130)				
134f	Income Tax Accounting.....	I	MWF	302B	Mr. Reighard
	(3 cred.; jr., sr., grad.; prereq., 137- 138 or 139)				
135f-136s	Auditing .....	III	MWF	302B	Mr. Reighard
	(6 cred.; jr., sr., grad.; prereq., 137- 138 or 139)				
137f-138w†	Accounting Practice and Procedure..	IV	MWF	303B	Mr. Heilman
	(6 cred.; jr., sr., grad.; prereq., 25-26)				
139f	Advanced General Accounting.....	III	MWF	303B	Mr. Heilman
	(3 cred.; jr., sr., grad.; prereq., 25-26)				
139w	Advanced General Accounting.....	III	MWF	303B	Mr. Heilman
	(See 139f)				
139s	Advanced General Accounting.....	III	MWF	303B	Mr. Heilman
	(See 139f)				
145s	Foreign Exchange .....	IV	MWF	109B	Mr. Myers
	(3 cred.; jr., sr., grad.; prereq., 3, and 4 or 6-7)				
146w	Investments .....	VI	MWF	102B	Mr. Weiden- hammer
	(3 cred.; jr., sr., grad.; prereq., 3, and 155)				
147s	Bank Administration .....	I	MWF	104B	Mr. Marget
	(3 cred.; jr., sr., grad.; prereq., 3, and 4 or 6-7)				
148s	The Securities Market.....	II	TThS	104B	Mr. Weiden- hammer
	(3 cred.; sr., grad.; prereq., 146, 149)				
150s	Advanced Farm Finance.....	VI-VII	W	104B	Mr. Myers
	(3 cred.; sr., grad.; prereq., 3, and 4 or 6-7)				

† The entire course must be completed before credit is received for any quarter.

‡ Credit may not be received for both B.A. 101-102 and B.A. 107.

## SCHOOL OF BUSINESS ADMINISTRATION

No.	Title	Hour	Day	Bldg.	Instructor
152s	Real Estate Valuation and Land Utilization .....	III	TThS	109B	Mr. Black
	(3 cred.; jr., sr., grad.; prereq., 4 or 6-7)				
153f	Real Estate Management and Practice .....	Ar	Ar	Ar	
	(3 cred.; jr., sr., grad.; prereq., 152)				
155f	Corporation Finance .....	III	MWF	102B	Mr. Stehman
	(3 cred.; jr., sr., grad.; prereq., 3 and 4 or 6-7)				
155w	Corporation Finance .....	III	MWF	102B	Mr. Stehman
	(See 155f)				
155s	Corporation Finance .....				Mr. Stehman
	(See 155f)				
	Lect.	III	F	202B	
	Sec. 1	II	MW	209B	
	2	III	MW	202B	
156f	Finance Management .....	I	TThS	102B	Mr. Stehman
	(3 cred.; jr., sr., grad.; prereq., 155)				
165f*	The Economics of Public Utilities..	III	TThS	202B	Mr. Garver
	(3 cred.; jr., sr., grad.; prereq., 3 and 4 or 6-7)				
165w*	The Economics of Public Utilities..	III	TThS	102B	Mr. Garver
	(See 165f)				
167w	Personnel Administration .....	I	TThS	202B	Mr. Stead
	(3 cred.; jr., sr., grad.; prereq., 161)				
168s	Advanced Personnel Administration..	I	TThS	209B	Mr. Stead
	(3 cred.; jr., sr., grad.; prereq., 167)				
177w	Foreign Trade .....	I	MWF	202B	Mr. Blakey
	(3 cred.; jr., sr., grad.; prereq., 176)				
180f-181w-					
182s†	The Senior Topics Courses.....				
	(School of Business Adm. seniors)				
	A. Accounting .....	II	TThS	302B	Mr. Reighart
	(6 cred.; winter and spring only)				
	B. Business Finance .....	VII-VIII	T	109B	Mr. Stehman and others
	(6 cred.)				
	C. Marketing .....	VI-VII½	TTh	104B	Mr. Vaile and others
	(9 cred.)				
	D. Personnel Management .....	Ar	Ar	Ar	Mr. Stead
	(9 cred.)				
	E. Secretarial Practice .....	IV	MWF	1B	Mr. Ostlund and others
	(6 cred.; fall and winter only)				
	F. Statistics .....	Ar	Ar	Ar	Mr. Mudgett
	(9 cred.)				
	G. Production Management .....	Ar	Ar	Ar	Mr. O'Hara
	(6 cred.; fall and winter only)				
	H. Insurance .....	Ar	Ar	Ar	Mr. Graves
	(3 cred.; spring only)				
183f,w,s	Senior Practice Course .....	Ar	Ar	Ar	Members of the staff
	(3 cred.; sr., grad.; no prereq.)				
194f-195w-					
196s†	Advanced Advertising Procedure.....	IV	F	104B	Mr. Vaile
	(3 cred.; jr., sr., grad.; prereq., 88)				

\* Not open to Science, Literature, and the Arts students.

† The entire course must be completed before credit is received for any quarter.

# *The Bulletin* *of the University of* **Minnesota**

*General Extension Division*

*Announcement of Extension Classes*  
*for the Two Years*

**1928-1930**



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## Extension Calendar

In case a class observes other holidays than those here shown, the sessions missed are to be made up by extra meetings within the semester limits.

1928			
September	24-29		Registration
October	1	Monday	First semester begins
November	29	Thursday	Thanksgiving Day; a holiday
December	22	Saturday	Christmas recess begins
1929			
January	2	Wednesday	Class work resumed
January 28-February 2			Examinations, first semester classes
February	4	Monday	Second semester begins
May 27-June 1			Examinations, second semester classes

Attention is called to the fact that the campus office of the General Extension Division is now located on the fourth floor of the new Administration Building, on southeast State Street. A contact office, where information may be sought and bulletins or other printed material obtained, is maintained on the first floor.

An Extension calendar for 1929-30 will be issued in connection with the schedule of classes for that year.

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## Opportunities through Extension Work

It is the function of the General Extension Division of the University of Minnesota to bring the benefits of university training to *all* citizens of Minnesota, including those who, for one reason or another, cannot take advantage of the instruction offered on the University campus. By this means, the University seeks to measure up to its full responsibility to the people of the state, who have built the University and who now support it.

There are many people to whom extension work opens an opportunity which otherwise they would lack. There are public school and high school teachers who wish to keep abreast of new developments in the work they are doing. There are industrial workers who must make a living, but who are anxious to devote spare time to training for advancement. There are business men and women who realize the advantages of a thoro training in the principles and practice of modern business, but who cannot give up their positions in order to pursue a full time vocational course. It is to serve these groups, as well as those who wish for further study with a view merely to self-development and culture, that the University has created the Extension Division.

The General Extension Division is prepared to organize and conduct late afternoon and evening classes in any community in the state where there is sufficient demand. For several years classes have been conducted in Minneapolis, St. Paul, Duluth, Hibbing, Virginia, and at other points. The director of General Extension will welcome the opportunity to co-operate with other communities in a similar way.

Such extension classes include:

1. Courses leading to credit in the College of Science, Literature, and the Arts, in the College of Education, and in the School of Business Administration. In extension classes of this nature many persons are completing a considerable part of the work required for a degree in the colleges mentioned. A certificate is now awarded for the completion of 90 credits of junior college work in Science, Literature, and the Arts.

2. Courses in accountancy, finance, and general business, a secretarial course, and a course in management and administration. The student who so desires may arrange his work in such

a way that he will be awarded a General Extension Division certificate in any of the above fields. Such certificates carry considerable weight in the business world, proving as they do the satisfactory completion of a considerable amount of university work in business subjects.

3. Practical courses in engineering and in industrial subjects. Certificates in engineering are awarded to students who complete satisfactorily three or four years of engineering study.

Full information regarding these courses may be found in this bulletin.

Most of the courses listed in this bulletin may be regarded as **adult education** courses. Whether the student is seeking vocational training, credit toward a university degree, or merely the cultural value of expanding knowledge, he will find much in these courses to interest him. It may be desirable, however, to emphasize under the head of adult education the more advanced cultural subjects, such as history, literature, philosophy, political science, psychology, sociology, and the like.

Note that "auditors" may be admitted to any of these classes upon the payment of the usual fee. They may do as much or as little of the required work as they see fit. They receive no credit toward a certificate unless they complete the work and pass the examination, but they may get the full cultural value of the study none the less. The actual good they receive depends entirely on the amount of effort they put into the study.

Many other subjects of great interest and cultural value may be added to these courses whenever the demand justifies it. There are many phases of history, literature, and the social, as well as the natural, sciences which would be of great value to the adult student, but which could not be given credit toward a degree. The General Extension Division will gladly lend its assistance in the development of such courses of study as rapidly as the interest of the public makes it possible. Requests and suggestions regarding such courses will be given every possible attention.

Other extension activities include correspondence courses in each of the three groups of subjects above, totaling about two hundred courses; and a Municipal Reference Bureau and Community Service Department (see last page of this bulletin).

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## General Information

The General Extension Division is organized to meet the needs of persons who are unable to matriculate and enroll as full time students in the University. Its purpose is to serve office, store, and factory employees, teachers and homemakers, and persons seeking wider culture or sounder technical training. To this end, in addition to other activities, it organizes and directs late afternoon and evening classes in any part of the state where there is sufficient demand. Through such extension classes and through its correspondence courses the opportunity is presented to pursue subjects included in a liberal or vocational education, and to have these subjects credited toward an academic degree. It is understood that students desiring credit must meet the academic entrance requirements. For those whose preparation is incomplete, the opportunity is offered to make up the deficiencies and to continue with the regular course.

The extension year is divided into two semesters of sixteen weeks each, with an extra week devoted to examinations. Classes usually meet once a week in a two-hour session. Such classes ordinarily carry three credits or "credit equivalents" (see below). Those meeting more frequently and requiring more time in preparation carry more credit.

**Admission.**—It is not intended that any regulation should debar from the privilege of these courses any person who can profitably pursue them. Those persons who desire credit toward an academic degree must, however, comply with the regulations governing such degree. Those not desiring credit will be admitted, provided they are sufficiently mature (more than eighteen years of age), and can satisfy the department in which they wish to study that they are able to carry the work profitably to themselves and without hindrance to the class. Students may attend any class once before registering. All classes, except those in swimming, are open to both men and women.

Students who are graduates of accredited high schools or other approved preparatory schools are urged to file their credentials with the university registrar, so that the credits earned in the General Extension Division may apply toward a university degree.

**University admission.**—Applicants for admission to the University who are high school graduates, or who are at least nineteen years of age and are unable to meet the requirements for entrance by certificate will 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.

Applicants failing to pass tests (b) or (c) 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.

Entrance requirements may also be met by taking the entrance courses offered by the Correspondence Study Department of the General Extension Division. (See the university bulletin of general information for further particulars.)

**Registration.**—Students should register at the General Extension offices before the second meeting of the class in which they expect to enroll. Downtown offices are located in Minneapolis, St. Paul, and Duluth (see page 17 for location of these offices) in addition to the general office on the campus. A class card will be given to the student at the time of registration, which must be presented to the instructor. In towns where no extension offices exist, students will register with the instructor.

No student will be regarded as registered in any class until he has paid the required fee and presented his class card to the instructor.

Students are urged to enroll in advance for all extension classes. Registrations, as a rule, will not be taken at classes but must be made either at the city offices or at the campus office of the General Extension Division.

**Advice on registration.**—Students who have had sufficient preparation need not start at the beginning of a subject but may take up the work at the point where they can pursue it with advantage.

It has been found that many persons register who cannot take the work with any great profit to themselves because of inadequate preparation. For this reason it is desirable that students should consult with the head of the department concerned, or with the Students' Work Committee, before taking up any course, so that they may have proper guidance and direction.

**"Credit equivalents" for extension courses.**—Every student who successfully completes a course offered by the General Extension Division (including passing the final examination in that course) receives a "credit equivalent" equal in amount to the credit stated in the announcement of the course.

"Credit equivalents" for subjects prescribed in group courses leading to extension certificates (see pages 19, 42, and 53) may be counted directly as credits toward such certificates.

The credits in the General Extension Division are now computed in terms of "quarter" hours, in accordance with the present university usage, and not in "semester" hours, as was formerly the case. One semester credit equals one and one-half quarter credits. Classes meeting once a week for one semester normally carry three credits.

**Conversion of credit equivalents into university credits.**—Subject to the regulation that candidates for degrees must be regularly matriculated, and must complete in residence study a minimum of 45 quarter credits, "credit equivalents" may also be applied as credits toward a degree in any college of the University, so far as the subject conforms to the curriculum requirements of that college. The College of Engineering accepts extension credits toward an engineering degree by comprehensive examination.

**Residence requirements.**—By action of the University Senate, attendance on extension classes in Minneapolis, St. Paul, and Duluth is interpreted as meeting the requirement of residence at the University.

**Application of credits.**—Students desiring credit toward a degree must, of course, satisfy the entrance requirements of the college in which the degree is sought. Virtually all the courses listed under the headings Science, Literature, and the Arts; Education; and Business carry university credit unless otherwise specified. Some courses listed under Engineering carry credits; others do not. Such credits will be recorded in the registrar's office when the student has matriculated and established a record in the University.

Students must indicate at the time of registration whether or not they desire university credit in the courses pursued. Changes from "no credit" (auditor) to "credit" registration will not be made after the middle of the semester, and will be made only with the consent of the instructor and at the campus office of the General Extension Division. Changes from "credit" to "no credit" registration must be made one week before the end of the semester and at the campus office of the General Extension Division.

In many cases, by departmental regulations, the completion of more work in a subject than is included in one extension semester course is required before credit for any part of it can be counted on a degree. For information as to such courses see bulletins of the several schools and colleges.

The following regulations govern credit in the College of Science, Literature, and the Arts:

1. All courses for which credit is given in the College of Science, Literature, and the Arts, must be authorized with the credits by the Advisory Committee. But credits will be given only to those extension courses which are conducted in essentially the same manner as the corresponding courses in the University, and which are carried on under similar conditions as to attendance, term's work, quizzes, and examinations.

2. Each credit course shall be directly in charge of a member of the faculty.

3. Any regularly enrolled university student successfully completing an approved course shall receive the appropriate credit.

4. Any person shall receive a certificate upon satisfactorily completing an approved course. The certificates entitle the holder to the corresponding university credits whenever he has earned forty-five credits in residence. The registrar or the Students' Work Committee shall in all cases pass upon the qualifications of the student.

5. Credit for an amount not exceeding one quarter of the unit hours required for graduation may be given at the University of Minnesota to students of such other extension schools or departments as may be approved by the Advisory Committee, provided that such credit shall be subject to the same provisions as govern credits in the General Extension Division of the University of Minnesota.

The following limitations as to students in residence at the University should also be noted:

1. No university student may enroll for extension courses for the purpose of removing a condition or failure.

2. No university student may enroll for an extension course if this would increase his credit hours beyond what the rules allow.

3. Any university student who wishes to enroll for an extension course must first obtain the approval of the dean of his college.

**Examinations.**—Examinations in all of the subjects given are conducted during the last week of each semester. All students who are eligible for credit and desire it must pass these examinations.

Condition examinations will be conducted at the convenience of the instructors. Students having conditions must pass a condition examination within two semesters following the resumption of the student's extension work, otherwise the condition becomes a failure. A fee of \$1 is charged for each such examination.

A grade of "incomplete" not removed by the end of the second semester following the resumption of the student's extension work, becomes a condition or a failure as the instructor may direct.

**Fees.**—The fee for an extension class, meeting one evening a week for two hours, and continuing through one semester of seventeen weeks, with three hours credit, is \$10. Wherever the fee is more or less than this standard the amount is stated in the program of classes.

In case a student takes three or more courses simultaneously, a reduction of 10 per cent is made in the total fee of \$30 or more.

The fee does not include the cost of text or materials. Where mimeograph material is supplied in place of a basic text, a uniform charge of \$1 is made, payable at time of registration.

All fees are payable at the time of registration, and registration should not be deferred later than Saturday of the first week in which classes begin. A privilege fee for late registration goes into effect after the first week of classes, beginning with the second semester of 1928-29. Checks should be made payable to the University of Minnesota.

**Late registration.**—An additional privilege fee for late registration is charged as follows: \$1 per course during the third week of the semester, and \$2 per course during the fourth week. Each week is construed to extend through Saturday evening. Two meetings of each class will therefore have been held before these privilege fees become operative. No registration will be accepted later than the fourth week of a semester after the week in which the class begins, without the approval of the Students' Work Committee. Beginning with the second semester of 1928-29 and thereafter, an additional privilege fee will be charged after Saturday of the first week in which classes begin.

**Refunds.**—Students who cancel their registration before the middle of any semester may obtain a pro rata refund of the tuition fee, provided written notice is given the office of the General Extension Division at the time of cancellation. No refund is made after the eighth week of the semester. In no case will a refund be made to a student of a class organized on a minimum registration basis. Two dollars (\$2) of each fee is non-refundable, being withheld to cover expenses of registration.

**Class attendance.**—Every student is expected to attend the meetings of his class regularly. For credit toward a degree or a certificate the following rule must be adhered to:

"No student whose absence exceeds three of the regular scheduled sessions of the course for a semester shall be admitted to the final examination of the course without special permission of the Students' Work Committee.

**Reports of students' work.**—Reports of students' work and grades are sent to the office of the registrar of the University at the close of each semester. A report of the grade and credit earned is sent from that office to the student. This information will not be given out at the office of the General Extension Division.

**Students' Work Committee.**—The Students' Work Committee of the General Extension Division has direct supervision over the scholastic work done by the students of the division. It also functions as an advisory group for students desiring information about sequence of courses, credits, certificates, relation of extension courses to courses offered in other colleges, credits offered from other institutions, and like matters. There is a representative of this committee at the main office of the General Extension Division during the day, where he may be consulted or appointments may be made for consultation at other than business hours.

**Credits from other institutions.**—The General Extension Division accepts credits from other institutions of equal grade with the University without examination upon a proper showing of work completed. In many instances students who have had courses in institutions not of equal grade may have credit allowed for such courses upon examination. A nominal fee is charged for this examination. Students desiring credit either with or without examination should consult the Students' Work Committee. If an examination is required this committee will arrange for it. The prospective student should submit an official statement showing the work done, grade and credit received from such other institution.

**Normal load of extension work.**—A normal load of extension work to be carried by an employed student is nine credit hours—the equivalent of three semester classes per week. The maximum is twelve credit hours—the equivalent of four semester classes a week, which may be allowed to a student by special permission of the Students' Work Committee if his record of a previous semester shows an average of one and one-half honor points per credit hour. Permission to take more than the maximum of twelve credit hours will be granted only under exceptional circumstances.

**Correspondence study.**—No student enrolled in extension classes is permitted to carry work by correspondence study without permission from the Students' Work Committee. No one may enroll for correspondence study if the work so taken would increase his credits beyond the permissible maximum.

**Two-class schedule.**—In a number of instances classes have been so scheduled that a student may take two classes in an evening. The first class normally commences at 6:20 p.m. and the second at 8:05 p.m. This schedule has been so arranged that a student may take two classes of his course on the same evening and thus avoid spending two evenings.

**Length of courses.**—Most of the classes meet once a week for two hours, for a period of sixteen weeks, with an additional week for final examination.

**Program of classes.**—The time of meeting of the classes is stated in a printed program or schedule of classes issued by the General Extension Division at the beginning of each semester. Ordinarily the classes will meet at 6:20 and 7:30 or 8:05 p.m., but a suitable time will be scheduled for any group. Classes arranged primarily for teachers often meet at 4:00 or 4:15 p.m. The program for the first semester will be sent out about September 10.

It should be understood that not all the courses listed in this bulletin are given in any one year. Final announcement of the courses offered in any semester will be found in a program issued for that semester.

The Minneapolis classes meet at the University, the Minneapolis City Hall, the Library, and public school buildings. The St. Paul classes meet at the St. Paul City Hall, the Library, the Y.W.C.A., and public school buildings. The Duluth classes meet in the St. Louis County Courthouse and the Central High School.

The exact place and time of meeting of each class will be announced in the program of classes.

Extension classes do not ordinarily observe the regular university holidays, except as shown in the calendar prefixed to this bulletin. When sessions are missed for any reason they are to be made up by extra meetings within the semester limits.

**Size of classes.**—Classes will not be organized ordinarily for a smaller enrolment than fifteen. Under exceptional circumstances some continuation classes will be conducted for a minimum of twelve students. However, it should be understood that in some classes a larger registration will be required. Variations of the above rule will be made only at the discretion of the director.

Any course announced may be withdrawn if the registration for that particular course is considered insufficient. In case of withdrawal of any course the full fee paid will be refunded.

**General Extension Division offices.**—The General Extension Division maintains the following offices, where full information and bulletins may be obtained. Registration in all courses will be taken at these offices:

**Minneapolis:** Room 736 Security Building (telephone, Main 0624).  
New Administration Building, University campus (telephone, Dinsmore 2760).

**St. Paul:** Room 920 Pioneer Building (telephone, Cedar 7312).

**Duluth:** Room 404 Alworth Building (telephone, Melrose 7900).

## Department of Science, Literature, and the Arts; and Education

**Purposes.**—The courses offered in this department are selected largely from the College of Science, Literature, and the Arts. Four main purposes are in view.

1. To afford an opportunity to the student who is a candidate for a degree, but is unable to pursue his full course in the day classes at the University.

2. To enable the student who desires to complete the full requirements of the junior college course to do so, without the necessity of attending the day classes.

3. To bring the advantage of university training in cultural subjects to those who can devote one or more evenings a week to such work, regardless of any desire for university credit.

4. In addition to the above, many classes in Education are offered, which carry credit in the College of Education.

In general the purpose is to bring the advantages of the College of Science, Literature, and the Arts, and the College of Education to the student who, because of employment, is unable to take advantage of the courses offered during the day on the University campus.

**Courses offered.**—Naturally only a portion of the numerous "academic" or "collegiate" courses offered by the University to its resident students can be given through extension classes. Graduate courses are excluded by a regulation of the Graduate School to the effect that no credits earned in extension courses may be counted toward an advanced degree. Research courses, advanced laboratory courses, and courses requiring a large amount of library reading are by their very nature unfitted for extension teaching; and some subjects tho of a more elementary nature are ruled out because of the difficulty of getting the minimum class of fifteen. Additional courses to those listed in this bulletin will be given upon the request of any responsible individual or group willing to organize a sufficiently large class to insure the success of the undertaking.

The number prefixed to the course is usually the same as that given to the corresponding course in the regular college bulletin. The letters *ex* affixed to a number indicate either that the course is not given in the regular campus work or that it is materially modified for the purposes of extension teaching.

**Junior college certificate.**—Credits earned in this department may be applied toward a university certificate, certifying that the student has completed the full course required in the Junior College. If the student desires to continue his work in the Senior College of the University of Minnesota or in any professional school's, he should advise early with the Students' Work Committee of the General Extension Division, that proper care may be taken to plan so that the student may have the course required as preparation for a major in the Senior College, etc. Since it is impos-

sible at present to make available to evening students the work in physical education and military drill required of all junior college students on the campus, arrangements have been made whereby students receiving their junior college certificate through work accomplished in evening classes, will be allowed to carry the work in physical education and military drill during the senior college year. Those students continuing their work in the Senior College will be expected to conform fully to the entrance requirements of that college.

### General Course Leading to the Junior College Certificate

**General requirements.**—The student must earn 90 credits and must maintain a C average,

The student may not receive credit for beginning courses (two semesters, 6 credits) in more than one modern language, unless the Students' Work Committee approves such courses as necessary for the proper development of the student's work.

**Special requirements.**—The following special requirements should be noted.

Group A English.

Group B Foreign languages: French, Spanish, German, Scandinavian.

Group C Social sciences: Economics, History, Geography, Political Science, Sociology.

Group D Natural sciences: Zoology, Psychology, Chemistry, Astronomy.

Group E Architecture, Mathematics, Music, Philosophy, Art, Anthropology, Education, Child Welfare, Home Economics, Music, Journalism, Greek in English, Forestry, etc.

Candidates for the junior college certificate must have completed the following in the General Extension Division or the equivalent in another recognized institution:

1. Group A 15 credits in English (English 1, 2, 4, 5, 6).

Group B The student must present for entrance four years of one foreign language, or he must complete 15 credits in one language in the Junior College. For every full year of a foreign language presented for entrance the above requirement shall be lowered 4 credits.

Group C 9 credits in one subject.

Group D 9 credits in one subject.

Group E No requirement.

2. Every student should plan to begin work in each of the Groups A, B, C, and D as early as possible because otherwise completion of the required subjects may delay the completion of his course.
3. In addition the student is urged to secure the necessary preparation for a senior college major sequence in one subject. (Consult bulletin of the College of Science, Literature, and the Arts.)

**Credits and fees.**—For detailed statement concerning credits and fees, see under General Information.



**Schedule of classes.**—A printed schedule indicating the time and place of meeting for each class is issued about fifteen days before the beginning of each semester, and will be sent upon request. Courses marked with a star (\*) in the following lists were given last year.

## ART

For courses in history of architecture, elements of architecture, etc., see under Department of Engineering Instruction. Under the heading Home Economics a course in interior decoration is listed.

\*Art Ed. 1. Fundamental Principles of Design I. Elementary problems with emphasis on value relations; the decorative use of nature material. Three credits; one meeting a week, first semester. Mrs. Hanley.

NOTE.—Qualified students desiring the third term of Fundamental Principles of Design may take it at the same time that this course is offered.

\*Art Ed. 2. Fundamental Principles of Design II. Design in relation to the home; a study of period furniture with trips to the Institute of Arts, also a continuation of design problems related to public school work. Three credits; one meeting a week, second semester. Mrs. Hanley.

\*Art Ed. 7, 8, 9. Sketching. Drawing from the posed figure in charcoal, crayon, and pencil; action and memory drawing, blackboard practice. The course will help public school teachers in illustration work. Two credits; one meeting a week, second semester. Class limited to twenty-five. Mrs. Hanley.

\*Art Ed. 20, 21. Principles of Harmony in Form and Color I-II. Color theories of Munsell, Wilson, and Sargent, discussed and exemplified, with analysis of color harmonies and original work therein. Application of color harmonies in original designs throughout the year, with reference to execution in handicraft and by commercial processes. Six credits. (Not offered in 1928-29 unless by request.) Mrs. Hanley.

\*24-25-26. Freehand Drawing I-II. Freehand perspective drawing in pencil, pen, charcoal, and wash from geometric solids and architectural details. Drawing in charcoal and water color from still life, figure details, and the antique. Six credits; one meeting a week, first and second semesters. Mr. Burton, Mr. Doseff.

\*27-28-29. Freehand Drawing III-IV. Continuation of I and II. Drawing and painting from life, with lectures on anatomy and figure composition; assigned readings. Students completing both semesters will be taught how to make etchings. Prerequisite: Freehand Drawing I-II. Six credits; one meeting a week, first and second semesters. Mr. Burton.

\*30-31-32. Freehand Drawing V-VI. Continuation of III and IV. Prerequisite: Freehand Drawing III-IV. Six credits; one meeting a week, first and second semesters. Mr. Burton.

33. Bookbinding. An elementary course in the theory and practice of making books, such as simple folio books, the commercial cased books sewed over tapes, the old monastery books bound in leather and sewed over sunken cords and raised cords, the tooling and dyeing of leather,

wood blocking, simple portfolio making, and designing and execution of a bookplate. Lectures and practice in practical problems adapted to the needs of city teachers, occupational therapists, and social workers. Two credits; one meeting a week, first semester. Miss Ross.

- \*Art Ed. 46. Metal and Simple Jewelry. Fundamental processes of shaping, sawing, saw piercing, riveting, and soldering. Two credits; one meeting a week, second semester. Miss Ross.
- 1ex. Camp Craft Course. An elementary course in the theory and practice of crafts needed in camps, such as pottery, bookbinding, wood blocking, stenciling, tie dying, batik, reed basketry, pine needle basketry, gesso and clay substitutes.
- 2ex. Art Appreciation. A cultural course; being a survey of the art of Egypt, Persia, India, China, and Japan; the individual art of each country; interchange of influence; and effect upon present day art expression. The lectures will be illustrated by lantern slides and fabrics. Three credits. (Not offered in 1928-29.)

### ASTRONOMY

- \*11. Descriptive Astronomy I. Lectures and recitations on the general principles and fundamental facts of astronomy, illustrated by lantern slides, simple problems, naked-eye and telescopic observations. Three credits; one meeting a week, each semester. Mr. Beal.

### CHEMISTRY

#### INORGANIC CHEMISTRY

- \*9ex. General Inorganic Chemistry—the Non-Metals. A study of the common non-metallic elements and their principal compounds, with discussions of the laws and theories of chemistry. Five credits; one lecture, one recitation, and three hours laboratory work a week, first semester. Mr. Geiger.
- \*12ex. General Inorganic Chemistry and Qualitative Analysis—the Metals and Qualitative Analysis. A study of the common metallic elements and their principal compounds, with a further discussion of the laws and theories of chemistry, and systematic qualitative analysis. Open to students who have completed Course 9 or its equivalent. Five credits; one lecture, one recitation, and three hours laboratory work a week, second semester. Mr. Geiger.

#### ANALYTICAL CHEMISTRY

- \*1ex. Quantitative Analysis—Gravimetric. Introductory course covering the general principles and methods of quantitative analysis. Typical problems are assigned and attention given to proper laboratory practice. Prerequisite: Qualitative Analysis. Five credits; two meetings a week, 2½ hours each, first semester. Mr. Geiger.
- \*2ex. Quantitative Analysis—Volumetric. Continuation of Course 1ex. Five credits; second semester. Mr. Geiger.

- \*7ex. Quantitative Analysis—Pre-medical. An introductory course covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. Prerequisite: Qualitative Analysis. Given in connection with 2ex. Four credits; second semester. Mr. Geiger.

## CHILD WELFARE

- \*C.W.40. Child Development and Training. A brief study of the physical and mental development of the child is followed by a discussion of the training of young children. Behavior problems in their various aspects, and techniques of good and bad management will be considered. Three credits; one meeting a week, first semester. Miss McGinnis, Mrs. Faegre.
- \*C.W.50. Educational Methods for Young Children. A study of the education of the young child in the home. Stories, music, art, and dramatics, as well as the use of tools, toys, and a variety of occupational materials are discussed. The educational importance of play and of projects initiated and carried out by the children is stressed. Slides and moving pictures of children will be used for illustration and demonstration. Three credits; one meeting a week, second semester. Miss McGinnis, Mrs. Faegre.

## ECONOMICS

(See also Economic History, page 29.)

Classes in any of the subjects here listed will be formed on application of the minimum number of students.

3. Survey of Financial Institutions. For description, see Department of Business Instruction, page 47.
- \*6. Principles of Economics I. For description, see Department of Business Instruction, page 50. Three credits; one meeting a week, first semester.
- \*7. Economic Problems. For description, see Department of Business Instruction, page 50. Three credits; one meeting a week, second semester.
85. Economics of Marketing. A general course dealing with the mechanism and operation of markets, the price making processes, wastes of competition, etc. See page 50.
- \*101. Advanced General Economics. For description, see Department of Business Instruction, page 50.
135. Methods of Price Forecasting. For description, see Department of Business Instruction, page 50.
- \*146. Investments and the Stock Exchange. For description, see Department of Business Instruction, page 48.
- \*149. Business Cycles and Forecasting. For description, see Department of Business Instruction, page 48.
- \*155. Business Finance. For description, see Department of Business Instruction, page 47.
172. Economics of Transportation. For description, see Department of Business Instruction, page 52.

## EDUCATION

In addition to the courses listed below, attention is directed to the courses described under the heading Psychology, and also to the special courses in higher algebra (listed under Mathematics) in which considerable attention is given to the related problems of arithmetic and their presentation in the schools.

- 1ex. Methods and Sources for Nature Study. For description see under Nature Study on page 32 of this bulletin.
- 2ex. Field Course in Nature Study. For description see under Nature study on page 33 of this bulletin.
- \*3. Educational Sociology. A course designed to explain, from the sociological standpoint, what the aims of education are, and what subjects are of most value; also designed to show how education can predetermine the institutions of the future. Three credits; one meeting a week, first semester. Mr. Finney.
- \*Ed.Psy.55. Elementary Educational Psychology. A survey of fundamental facts of human behavior involved in educational activities. Introduction to test and measurement in education, and general statistical methods; analysis of the learning process; suggestions for improvement of study; criticism of marks as measures of school work. Open to qualified students. Three credits in College of Education only; one meeting a week, each semester. Mr. Sorenson, Mr. White.
- \*Ed.Psy.60. Introduction to Statistical Methods. A study of statistical methods as applied to educational investigation. Designed chiefly to meet the needs of classroom teachers and principals. No knowledge of higher mathematics is assumed. Three credits; one meeting a week, each semester. Mr. Van Wagenen.
- Ed.Psy.111. Educational Measurements in the Elementary School. A laboratory course in the study of the variations in school attainments of pupils in the elementary and junior high school, their measurement, nature, amount, and causes. A critical study of the nature of achievement tests and scales, their administration, and the analysis and use of their results. Three credits; one meeting a week, each semester. Mr. Van Wagenen.
- \*Ed.Ad.119. Elementary School Curriculum. Study of the principles underlying the organization of subject-matter for courses in the elementary school; examination of curricula, syllabi, and texts in the light of their function. Survey of scientific research in curricular content by subjects. Three credits; one meeting a week, each semester. Mr. Sorenson.
- \*Ed.Ad.124. Educational Administration. The present status and tendencies in the organization and administration of state and city school systems with interpretations. Three credits; one meeting a week, second semester. Mr. Sorenson.
- Ed.Psy.134. Mental Tests. Study of mental variation in children, its nature, degrees, causes, and effects. A laboratory course in the study of individual differences by means of mental tests. A critical study of group tests. Methods of treating superior and subnormal children in

- schools. Three credits; one meeting a week, each semester. Mr. Van Wagenen.
- \*Ed.Ad.160. Principles of Supervision. An analysis of the functions and duties of a supervisor as related to the improvement of instruction; specific supervisory technique; objective analysis of classroom activity; concrete applications to present day problems; case studies. Three credits; one meeting a week, each semester. Mr. Sorenson.
- H.Ed.101. Foundations of Modern Education. Historical analysis and interpretation of the more important elements in modern education derived from the Hebrews, Greeks, Romans, Middle Ages, and Renaissance. Three credits; one meeting a week, first semester. Miss Alexander.
- \*H.Ed.103. History of Modern Elementary Education. The institutions, theories, and problems of modern elementary education in the light of their history. Emphasis upon the rise of state systems and upon the history of modern educational reform. Three credits; one meeting a week, second semester. Miss Alexander.

## ENGLISH

## COURSES IN LITERATURE

- \*1. Freshman Literature I. Study of two of Shakespeare's plays, followed by a consideration of Ibsen's *Hedda Gabler*; *The Doll's House*; and Shaw's *Caesar and Cleopatra*. Lectures, recitations, and assigned readings. Three credits; one meeting a week, each semester. Miss Jones.
- \*2. Freshman Literature II. Study of prose literature; Macaulay, Newman, Huxley, Stevenson, and other essayists of the nineteenth century. Lectures, recitations, and assigned readings. Three credits; one meeting a week, each semester. Miss Jones.
- \*3. Freshman Literature III. A continuation of Freshman Literature II. Three credits; one meeting a week, each semester. Miss Jones.
- 21-22-23. Introduction to English Literature. Students must take two consecutive semesters to receive credit. Students may enter any semester. Two semesters are required as prerequisite for a major sequence or for a teacher's certificate. Nine credits; one meeting a week, first and second semesters.
- 31-32. Development of the English Novel. Principles and personalities in the evolution of the English novel. Written reports on selected novels. The entire course must be completed before credit is received for either semester. Six credits; one meeting a week, first and second semesters.
33. The Later English Novel. Prerequisites: Courses 21-22 or Shakespeare 55-56. Three credits.
- \*69. Browning and Tennyson. Three credits; one meeting a week, each semester. Mr. Powell.
- \*55-56. Shakespeare I-II. Shakespeare's development as a dramatist. A careful study of a selected list of Shakespeare's plays. Six credits; one meeting a week, first and second semesters. Mr. Nichols.

- \*66ex. The English Novel. A course dealing with the novel from the time of Scott to the present. Introductory lectures on the earlier novel; a study of Scott, Dickens, Thackeray, George Eliot, Meredith, Hardy, and others, with some work on twentieth-century fiction if time permits. Required reading of at least eight novels. Three credits. (Not offered in 1928-29.) Mr. Hillhouse.
70. Elizabethan Drama. Shakespeare's later development as a dramatist with some attention to the general history of English drama from 1603 to 1642. The course will include the reading of all Shakespeare's later plays and of the masterpieces of his chief successors. The decadence of Elizabethan dramatic art will be studied, and consideration given to the evolution of the modern, or picture stage. Three credits; one meeting a week, second semester.
- \*73-74. American Literature I-II. Lectures on American literature, with extensive readings from the principal poets and prose writers of the United States. Little attention is paid to the novelists in this course. Six credits; one meeting a week, first and second semesters. Mr. Moore, Mr. Nichols.
- \*129. Modern Drama. Reading of about twenty-five plays by the chief dramatists, English, American, and Continental, beginning with Ibsen. Lectures on background material, and class discussions of plays assigned. Three credits. (Not offered in 1928-29.) Mr. Hillhouse.
151. Recent Poetry. Poetry in England and America since the death of Queen Victoria; the main tradition and tendencies now prevailing. Three credits; one meeting a week, second semester.
- NOTE.—Graduate credit will not be allowed for this course.
- \*155. The American Novel. The beginnings of the American novel and short story and their development to about 1865. Among the writers included are Charles Brockden Brown, Irving, Cooper, Poe, Hawthorne, Thomas Bailey Aldrich. Three credits. (Not offered in 1928-29.) Mr. Moore.

NOTE.—Graduate credit will not be allowed for this course.

#### COURSES IN COMPOSITION

For a course in Business English, see that heading under Department of Business Instruction, page 49.

- \*4. Composition IV. Practical training in writing, largely exposition; analysis of prose selections and of compositions written by the class. The student will be required to do a certain amount of reading from the classics. Three credits; one meeting a week, each semester. Miss Jones.
- \*5. Composition V. A continuation of the preceding course. Three credits; one meeting a week, each semester. Miss Jones.
- \*6. Composition VI. A continuation of Courses 4 and 5. A brief study of the essay, and of exposition, description, and narration. Three credits; one meeting a week, each semester. Miss Jones.

NOTE.—Composition IV, V, VI is the equivalent of the freshman work in English in the university day school.

- \*11-12. *Description and Narration.* Principles and practice of description and narration, with analysis of selected specimens. Open to those who have completed Courses 4, 5, 6. Six credits; one meeting a week, first and second semesters. Mrs. del Plaine.
- \*20. *Informal Exposition.* Description and narration as methods of exposition; the informal essay. Extensive reading in the informal essay, both British and American; a study of the informal essay in current magazines, and practice in writing. Three credits; one meeting a week, each semester. Mrs. del Plaine.
- \*69-70. *Short-Story Writing.* An advanced course in writing for those who have had experience in writing for publication or have had preliminary training in the technique of writing. Open for credit only to those who have had at least two years of college courses in writing or the equivalent. Six credits; one meeting a week, first and second semesters.
- 51ex. *English for Engineers.* A course in practical English, designed to meet the professional needs of engineering students. The material of this course will include business letters—about twelve types, reports, estimates, instructions, etc. Some attention will be given to oral English. Three credits; one meeting a week, first semester.

#### COURSES IN PUBLIC SPEAKING

For courses in Public Speaking, etc., see under Speech, page 39.

#### ESPERANTO

1. *Beginning Esperanto.* Pronunciation, grammar, and selected readings in prose and poetry with special emphasis on conversation. No credit; one meeting a week, first semester. Mr. Wendell.
2. *Advanced Esperanto.* A continuation of Course 1. Advanced prose readings, composition, and correspondence with foreign Esperantists. No credit; one meeting a week, second semester. Mr. Wendell.

#### FORESTRY

1. *Forest Conservation.* Dealing with the history and development of the forests of Europe and discussing the forest problems of the United States in the light of the progress already made in other countries, with special emphasis on our national forest policy and our state forest policy; fire protection, taxation, etc. Three credits; one meeting a week, first semester. Mr. Cheyney.

#### GEOGRAPHY

- \*51A. *Human Geography.* A study of space relationships and climatic types as they affect human activities and the distribution of population. No prerequisite. Three credits; one meeting a week, first semester. Mr. Davis, Mr. Everly.
- \*51B. *Human Geography.* A study of soils, drainage, land forms, contact with the sea, and mineral wealth as they affect human activities and

the distribution of population. Prerequisite: 51A. Three credits; one meeting a week, second semester. Mr. Davis, Mr. Everly.

- 61A. Geography of Commercial Production. A study of the geographic basis for the production of agricultural commodities entering into world trade, together with a consideration of the areas of consumption. Prerequisites: 51A and 51B, or ten credits in economics. Three credits; one meeting a week, first semester. Mr. Davis.
- 61B. Geography of Commercial Production. A study of the forest and mineral industries and their geographic basis. Special attention will be given to the factors localizing great manufacturing districts. Prerequisite: 61A. Three credits; one meeting a week, second semester. Mr. Davis.

### GERMAN

- \*1. Beginning German Ia and Ib. Open to students who have had no German, but both semesters must be completed before credit is given. Six credits; one meeting a week, first and second semesters. Mr. Kroesch.
- \*2. Beginning German IIa and IIb. Continuation of the above. Six credits; one meeting a week, first and second semesters. Miss Wangness.
10. Rapid Reading I and II. Short stories and dramas by Storm, Heyse, Baumbach, Lessing, Goethe, Schiller, Hebbel, and Sudermann. Class work and discussions are conducted in German. Open to students who have had at least one year of German. Six credits; one meeting a week, first and second semesters. Mr. Davies.
13. Elementary Conversation I and II. Conversation on topics of everyday life, aiming at fluency in the case of idiom; not a course in composition; organized on the laboratory basis. Intended for those who have had at least one year of German. Six credits; one meeting a week, first and second semesters. Mr. Davies.
- \*17. German for Graduate Students. Open to students who have had one year of German. This course is intended for candidates for advanced degrees who wish to acquire a reading knowledge of German. No credit; one meeting a week, each semester. Mr. Lussky.

### GREEK IN ENGLISH

- \*1. Greek Mythology. A course of lectures, textbook work, and illustrative reading; dealing with the myths which appear in the literature and art of ancient Greece. The course will be illustrated with the stereopticon. The origin and evolution of the myth, its relation to Greek literature, philosophy, and religion, and its influence upon later literature will be touched upon. No knowledge of Greek is required for this course. Three credits; one meeting a week, second semester. Mr. Savage.
2. Greek Literature and Life. A course dealing with the literature, life, and art of the ancient Greeks. Lectures and illustrative readings by the instructor, assigned readings in translations and textbook work by the class; conferences and informal discussions. The character and in-



fluence of Greek culture, especially along the lines of literature and art will be discussed, and the course will be illustrated with the stereopticon. No knowledge of Greek is required. Three credits; one meeting a week, first semester. Mr. Savage.

- \*3. Greek Drama in English. A critical reading and interpretation of representative Greek plays in English translation, together with lectures on the origin, development, character, and influence of the Greek drama, and special stereopticon illustrations of Greek plays and Greek theaters. Lectures supplemented by textbook work, readings, and informal discussions. No knowledge of Greek is required. Three credits; one meeting a week, first semester. Mr. Savage.

## HISTORY

### JUNIOR COLLEGE COURSES

- \*1. Modern World I. Survey of political, social, and economic factors and events in European history from 1648 to the rise of Napoleon. Three credits; one meeting a week, first semester. Mr. Perry, Mrs. Mudgett.
- \*2. Modern World II. Survey beginning with the Napoleonic period, giving special attention to the reform and revolutionary movements, and to the formation of new states in Europe. Three credits; one meeting a week, second semester. Mr. Perry, Mrs. Mudgett.
- \*3. Modern World III. Europe since 1870, with particular reference to international alliances and rivalries, economic and political expansion and the new imperialism, the diplomatic background of the Great War, the Great War and the treaties of peace, efforts at reconstruction and the new Europe. Three credits; one meeting a week, first semester. Mr. Perry, Mrs. Mudgett.
- \*7. United States, 1776-1840. Survey of Development of the United States from the Revolution to 1840, with special reference to growth of democratic institutions, the influence of the West, and the growing nationalism. Three credits; one meeting a week, first semester. Mr. Perry, Mrs. Tyler.
- \*8. United States, 1840-77. Survey of the background of the Civil War, the war and reconstruction, with special reference to slavery, westward expansion, the frontier, the Public Land question, and the social, political, and economic systems before and after the war. Three credits; one meeting a week, second semester. Mr. Perry, Mrs. Tyler.
- \*9. Recent American History. The national period after 1877. Special emphasis on the social and economic factors. Three credits; one meeting a week, first semester. Mr. Perry, Mrs. Tyler.
- 14ex. The Middle Ages. An outline of medieval history from the fall of the Roman Empire to about 1300, with emphasis upon such topics as feudalism, the medieval church, the crusades, conflicts of papacy and empire, and medieval culture. Three credits. (Not offered in 1928-29.) Mr. Krey.

- 15ex. The Renaissance. Outline of European history from 1300 to 1648, with emphasis on the development of the intellectual, artistic, and social phases of civilization. Open to all. Three credits. (Not offered in 1928-29.) Mr. Krey.

## SENIOR COLLEGE COURSES

- \*80-81. Introduction to Economic History. Outline of general economic development; industrial revolution in England and America; changes in transportation and exchange, in land, capital, enterprise, and labor. Three credits; one meeting a week, first semester. Mrs. Mudgett.
- \*82-83-84. Economic History of the United States. Early colonial period to that following Civil War. Six credits; one meeting a week, first and second semesters. Mrs. Mudgett.
- \*101-102. The French Revolution and Napoleonic Era. A close study of the social, economic, and political changes of the period of the Revolution and Napoleon. Text, assigned readings, and term paper. Six credits; one meeting a week, first and second semesters. Mr. Perry.
112. History of American Immigration. Settlement and development of typical racial stocks in America. Text, lectures, and assigned readings. Three credits; one meeting a week, first semester. Mr. Stephenson.
- 122-123ex. Early Political Leaders of the United States. Outstanding men considered in connection with the political movement of their day. Lectures and assigned readings. Six credits; one meeting a week, first and second semesters. Mr. Perry.
143. American Political Parties. A study of the origin, organization, and activity of political parties, considering in some detail important presidential campaigns. Lectures, assigned readings. Three credits; one meeting a week, second semester. Mr. Stephenson.

## HOME ECONOMICS

- \*3. Textiles. Including a discussion of those points in fabric study that are of value to both the purchaser and seller of fabrics—fabric structure, fibers employed in their manufacture, methods of substitution and adulteration, tests for quality, art and economic considerations in their purchase for clothing and household purposes. Three credits; one meeting a week, each semester. Miss Caplin.
- 4ex. Clothing Selection. The aim of this course is to present the principles of color and design as they apply to clothing; to discuss the choice of fabrics; and to outline the economic factors in clothing selection. Two credits; one meeting a week, first semester. Miss Gorham.
- 5ex. Home Management Lectures. This course aims to meet the needs of homemakers and teachers as well as students. It plans to acquaint the student with the responsibilities and opportunities of homemakers for successful family life. A discussion of the management responsibilities of the homemaker with special emphasis placed upon the use of money in the home. Three credits; one meeting a week, first semester. Miss Whiteside.

- 6ex. Food Marketing. Food problems of the consumer. A study of the quality and cost of the foods on the market. Two credits; one meeting a week, first semester. Mrs. Glockler.
13. Clothing Planning and Construction B. A course in the technique of clothing construction that will give practice in the use of commercial patterns, modeling on the dress form, and application of construction processes. Instruction and practice in construction of a semi-tailored wool garment and a problem in infants' or children's clothing. Three credits; one meeting a week, first semester. Miss Gorham.
17. Advanced Clothing. Laboratory course in the designing, modeling, and construction of silk or wool costume, including millinery, and a problem to test acquired speed. Three credits; one meeting a week, second semester. Miss Gorham.
- \*131ex. Interior Decoration I. The course will be prefaced by such a discussion of house plans as will give a necessary background for the major part of the work. The principles involved in house furnishing will be taken up in lecture, illustrated by lantern slides and actual materials wherever possible. Such subjects as wall treatment, rugs, selection and arrangement of furniture, hangings, pictures, and accessories will be discussed at first separately, and later as they relate to each other and the room as a whole. Three credits. (Not offered in 1928-29.) Miss Morse.
- \*54. Interior Decoration II. A continuation of Extension Course 131ex. Furnishing schemes are planned for the living room, bedroom, and dining room; a special study is made of colonial work, accessories, silver, and china. Three credits. (Not offered in 1928-29.) Miss Morse.

### JOURNALISM

13. *Journalism: Introduction to News Writing.* A study of news; its sources; methods of finding and gathering; and correct style of written presentation. The class also includes a survey of the newspaper, touching on its place and purpose, and explaining in a condensed manner the technical and mechanical processes of newspaper production. Three credits; one meeting a week, first semester. Mr. Steward, Mr. McCoy.
69. *Writing of Newspaper and Magazine Special Articles.* A continuation of Journalism 13. A study of the specialized form called the special feature article. The class takes up typical subjects and their preparation for magazines, trade papers, Sunday newspapers, syndicates, house organs, and the like. It includes a study of the qualities that make stories salable, of the market for articles, and of the principles of illustration. Three credits; one meeting a week, second semester. Mr. Steward, Mr. McCoy.

### MATHEMATICS

One class in higher algebra (Course 5) will be organized for grade school teachers. In this class the relations of arithmetic and algebra will be stressed in such a way as naturally to aid the arithmetic teacher. In

general the last half hour of each session will be devoted to a discussion of specific teaching difficulties brought forward by members of the class, and to which a right understanding of the principles of algebra, and the relation to arithmetical processes, will usually suggest the solution.

- \*A. Plane Geometry I-II. A course covering elementary geometry as usually given in accredited high schools. Rectilinear figures and the circle, with miscellaneous original exercises and some elementary construction problems; proportion, similar triangles, proportional properties of line segments, proportional properties of chords and secants; trigonometric ratios, areas of polygons, regular polygons, and circles. Prerequisite: elementary algebra. One entrance credit; one meeting a week, first and second semesters. Mr. Edwards.
- \*B. Solid Geometry. A course of high school grade designed to give a knowledge of the standard theorems and exercises, to develop the student's imagination and initiative, and to give a well-rounded view of the subject by practice in special proofs and original exercises. Prerequisite: Course A. One-half entrance credit; one meeting a week, each semester. Mr. Edwards.
- 5. Higher Algebra I-II. A review and a collegiate treatment of the topics of elementary algebra for those who have had one year of elementary algebra. Not open for credit to those who present higher algebra for entrance to college. Prerequisite: Courses A and B or equivalent. Six credits; one meeting a week, first and second semesters. Mr. Edwards.
- 6. Trigonometry I-II. Logarithms and plane trigonometry. Prerequisite: Course 5 or preparatory higher algebra. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards.
- 7. College Algebra I-II. Quadratic equations, equations in the quadratic form, simultaneous quadratic equations, graphical representation, progressions, mathematical induction, the binomial theorem, permutations, combinations, probability, determinants, and the theory of equations with special reference to graphical methods. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards.
- 30. Analytic Geometry I-II. The elements of plane analytic geometry including the geometry of the conic sections, with a brief introduction to solid analytic geometry. Prerequisite: Courses 6 and 7. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards.
- 50. Calculus I-II. Differential calculus. Prerequisite: Courses 6 and 7, and 30. Six credits; one meeting a week, first and second semesters. Mr. Edwards.
- 51. Calculus III-IV. Integral calculus. Prerequisite: Course 50. Six credits; one meeting a week, first and second semesters. Mr. Edwards.
- 52. Calculus V-VI. Selected topics in differential and integral calculus with special reference to infinite series, partial differentiation, multiple integrals, and applications of the calculus. Prerequisite: Course 51. Six credits; one meeting a week, first and second semesters. Mr. Edwards.

## MEDICINE

- 1ex. X-Ray Diagnosis. This course is designed for practicing physicians. No credit; one meeting a week, first semester. Mr. Rigler.
- 2ex. Plate Reading. This course is designed for practicing physicians. No credit; one meeting a week, each semester. Mr. Rigler.
- 3ex. Fluoroscopy. This course is designed for practicing physicians. No credit; one meeting a week, second semester. Mr. Rigler.

## MUSIC

- \*1ex. How To Listen to Music, I and II. An approach to music from the point of view of the concert goer, the amateur; explaining in simple terms some of the facts and terminology of music, pointing out the criteria by which quality in music and in performance is judged, securing familiarity, through repeated hearing, with a representative list of typical compositions; the objective being sufficiently broadened understanding to insure a keener enjoyment of music heard. No credit; one meeting a week, first and second semesters.
- \*49ex. Historical Appreciation of Music. A general non-technical account of the principal musical forms, together with their historical origins and associations, and a study of the nature and scope of musical expressions, designed to give an understanding of music as literature. Biographical and critical reading required. The course will be extensively illustrated. Three credits; one meeting a week, first semester. Mr. Ferguson.
- 1-2-3. Harmony I-II-III. The study of chords, their construction, relations and progressions. Written exercises on basses, the harmonization of given melodies. (Each class covers the work of one quarter of Harmony, as given in residence.) Nine credits; one meeting a week, I and III first semester, II second semester. Miss Malcolm.
- 64ex. Orchestra Conducting (Including Band). Theory and practice of general principles of conducting. Technique of the baton and elements of interpretation. Comparison and differentiation of band and orchestra conducting. Elementary instrumentation. Two credits; one meeting a week, first semester. Mr. Pepinsky.
- 94ex. Ensemble Playing, Sight Reading, and Accompanying. A practical playing course for the study of chamber music literature. Open to players of all string instruments, piano, organ, flute, oboe, clarinet, bassoon, and French horn. Simple sonatas used for sight reading and accompanying; standard repertory for playing of trios, quartets, etc. Two credits; one meeting a week, first semester. Mr. Pepinsky.

## NATURE STUDY

- 1ex. Methods and Sources for Nature Study. A survey of biological and physical nature study designed to meet the needs of teachers of elementary schools. Methods of developing nature study both in the schoolroom and out of doors, and of correlating it with other subjects

are discussed. Three credits; one meeting a week, each semester. Miss Hall.

- 2ex. Field Course in Nature Study. A study of plant and animal life in their natural environment, together with the principal factors—soil, water, temperature, etc.—that go to make that environment. Field work supplemented by laboratory work. Three credits; one meeting a week, second semester. Miss Tillisch.

### NURSING

See also courses in Preventive Medicine and Public Health, page 35.

- 72ex. Teaching in Schools of Nursing. A study of the principles and practice of nursing as taught in schools of nursing; selection and organization of subject-matter; evaluation of text and reference books; making of lesson plans; methods of teaching. Particular emphasis will be laid on ward teaching. Two credits; one evening a week, first semester. Miss MacLurg.

### PARLIAMENTARY LAW

- \*7ex. Parliamentary Law. Presented not as a mere list of rules, but as a system, based upon principles, a knowledge of which will supply the answer to any of the seven thousand possible questions of procedure which may arise in the conduct of a deliberative assembly. The class is limited to forty members. No text is required, but *Robert's Rules of Order*, Revised, is used as a basis of the course; mimeographed material will be furnished to students without charge. No college credit; one meeting a week, each semester. Mr. Hawley.

### PHILOSOPHY

- \*1. Introduction to Philosophy. An introduction of the problems of philosophy through a reading of some of the more popular philosophic classics. Three credits; one meeting a week, first semester. Mr. Conger.
3. Principles of Ethics. A sketch of the development of morality followed by an analysis of conscience and a discussion of the nature and authority of moral principles. Three credits; one meeting a week, first semester. Mr. Wilde.
108. Types of Ethical Theory. A study of the various historical ideals of life held by great thinkers from Confucius to Nietzsche. Three credits; one meeting a week, first semester. Mr. Wilde.
110. Contemporary Philosophy. Critical discussion of the various forms of present day idealism, naturalism, pragmatism, and realism. Three credits; one meeting a week, second semester. Mr. Conger.
124. Political and Social Ethics. A study of ethical basis of society and the state and a consideration of some of the unsettled problems of politics and economics from the ethical point of view. Three credits; one meeting a week, second semester. Mr. Wilde.

129. Development of Political Thought. A history of theories in regard to the nature of the state and its relation to the individual from Plato to the present time, including the development of the ideas of sovereignty, liberty, toleration, and democracy. Three credits; one meeting a week, second semester. Mr. Wilde.

#### PLANT PATHOLOGY

- 2ex. Elementary Plant Pathology. A lecture, demonstration, and laboratory course on the diseases of plants. Particular attention is given to the nature and causes of disease of plants and to the principles of plant disease control. Typical diseases will be studied in the laboratory. Three credits; one meeting a week, each semester. Mr. Leach, Mr. Peterson.

#### POLITICAL SCIENCE

1. American Federal Government. An elementary course in American government and politics designed for those studying the problems of citizenship, and for teachers. Three credits; one meeting a week, first semester. Mr. Young.
3. Comparative European Government. An elementary course in the government and politics of the great European Powers of today with the special emphasis placed upon the study of Great Britain, Germany, France, Italy, and Russia. Three credits; one meeting a week, first semester. (Not offered in 1928-29.)
7. State Government. (Complementary to Course 1 above.) (Not offered in 1928-29.)
11. Municipal Government. The growth of cities; their legal status; municipal organization in the United States including the mayor and council, commission and city manager plans; municipal organization abroad; current municipal problems. Three credits; one meeting a week, first semester. Mr. Young.
25. World Politics. A general study of liberalism, nationalism, imperialism, and internationalism; a more detailed study of the government and present world problems of the British Empire; France and the Mediterranean, including Italy, Spain, and Belgium; Germany, Austria, Hungary, Czecho-Slovakia; Russia and the Baltic States; the Near East, including the Balkan States; the Far East, especially concessions and extra-territoriality; the United States as a world power. Six credits; one meeting a week, first and second semesters. Mr. Young.
135. Current Political Problems. Physical problems such as territory and the people; citizenship and Americanization; the electorate—its burdens and such reforms as proportional representation and the short ballot; the place of political parties; distribution of political powers; the making and amending of constitutions; the reorganization and improvement of the three departments of government; recent experiments with popular control—the initiative, referendum, recall, and direct primaries; internationalism and foreign affairs; struggle of classes or government

- by blocs; some municipal problems; the place of education in a democracy. Three credits; one meeting a week. (Not offered in 1928-29.) Mr. Young.
- \*145. Legislative Powers and Methods. Source and scope of the legislative power; methods used by legislative bodies; current political questions; formulation and defense of legislative bills. Three credits. (Not offered in 1928-29.) Mr. Young.
- \*157. Recent Social Legislation. The governmental powers used for social legislation, both state and federal; the methods used; peace and security from crime; safety and health; public morals, including such subjects as gambling, lotteries, speculation, intoxicating liquors, sexual vice, and public amusements; economic relations that are semi-social, such as advertising, minimum wage, and restrictions on contracts, city planning and police power restrictions on the use of private property. Three credits; one meeting a week. (Not offered in 1928-29.) Mr. Young.
158. Government and Business. Governmental powers; restraint of trade and manipulation of prices; protection of debtors; business affected with a public interest; combinations of laborers; corporations; compulsory benefits; conservation of natural wealth; vested rights; confiscatory legislation. Three credits. (Not offered in 1928-29.) Mr. Young.

#### PREVENTIVE MEDICINE AND PUBLIC HEALTH

- \*53. Elements of Preventive Medicine. The determining factor in individual health, susceptibility, resistance and immunity to disease; methods of spread and the prevention of communicable and degenerative diseases; protection of food, water, and milk; school health work; mental hygiene; etc. This course presents the basis essential to effective health work whether this work be in the practical field, such as public health nursing and physical education, or in the more theoretical side of teaching. Prerequisite: Psychology 1-2 and Zoology 1-2, or by permission. Three credits; one meeting a week, first semester. Mr. Diehl.
58. Maternal and Child Hygiene. The maternal welfare program; importance of breast feeding; conduct of infant welfare clinics in cities and rural communities; consideration of child of pre-school and school age as to malnutrition, physical defects, cardiac and nervous disorders. Prerequisite: 50 or 52 or 53. This course is intended for graduate nurses. Two credits; one meeting a week, second semester. Miss Boynton and others.
62. Principles of Public Health Nursing. Development, principles of organization, administration and supervision of public health nursing; methods of co-operative endeavor with social agencies; health teaching as an essential factor in the promotion of individual and community well-being. This course is primarily for students already active in the field of public health nursing. It aims to enlarge an appreciation of



- the community and individual health problems and to give a knowledge of some of the most effective methods of dealing with them. Graduate nurses only are eligible for enrolment with credit. Prerequisite: Course 53. Three credits; one meeting a week, second semester. Miss Butzerin.
63. Special Fields in Public Health Nursing. Development of special field in public health nursing; scope of program; analysis of services; class demonstrations and discussions. Prerequisite: 62 or equivalent. Three credits; one meeting a week, first semester. Miss Butzerin.
80. The Health of the School Child. Intended for teachers and others interested in child health and health education. Consideration of hygiene of physical and mental growth, health supervision of school children, teaching of health subjects, and sanitation of school environment. The course deals with practical problems of school health supervision and health education. Prerequisite: Course 50 or 53, or by permission. Three credits; one meeting a week, second semester. Mr. Diehl, Mr. Myers, Mr. Seham.

### PSYCHOLOGY

- \*1-2. General Psychology I-II. An introductory survey of psychology; its materials, fundamental laws, applications, and relations to other sciences. Six credits; one meeting a week, first and second semesters. Mr. White.
- \*3. Psychology Applied to Daily Life. The applications of psychology to selected problems in advertising and selling, law, medicine, and daily life. Prerequisite for college credit: General Psychology 1-2. Three credits; one meeting a week, each semester. Mr. White.
- \*Ed.55. Elementary Educational Psychology. A survey of fundamental facts of human behavior involved in education activities. For full description see under Education. Open to qualified students. Credited in College of Education, but not in College of Science, Literature, and the Arts. Three credits; one meeting a week, each semester. Mr. White.

### PUBLIC SPEAKING AND RHETORIC

See under English on pages 24 to 26 and under Speech, page 39.

### ROMANCE LANGUAGES

#### FRENCH

- \*1-2. Beginning French I-II. Grammar, pronunciation, reading, and practice in speaking; practice in conversation will be given early in the course. Open to all. Both semesters must be completed before credit is given for the first semester. Six credits; one meeting a week, first and second semesters. Mr. Clefton, Mr. Owens.
- \*3-4. Intermediate French I-II. Reading, grammar, and composition. French grammar review, readings from modern authors. Open to all who have had French 1-2. Both semesters must be completed before credit is

- given for the first semester. Six credits; one meeting a week, first and second semesters. Miss Guinotte.
- \*5. French Readings for Graduate Students. Outline of grammar and reading of texts to prepare students for the French examination required of those who are candidates for advanced degrees. No previous knowledge of French required. One meeting a week, each semester. Mr. Frelin.
- \*20. Elementary French Conversation and Composition I-II. The course will include a careful drill in pronunciation and practical phonetics. Prerequisite: French 3-4. Six credits; one meeting a week, first and second semesters. Miss Nissen.
- 35-36. Contemporary French Literature I-II. Six credits; one meeting a week, first and second semesters. Miss Nissen.

## SPANISH

- \*1-2. Beginning Spanish I-II. Grammar, pronunciation, reading, and practice in speaking. Open to all. Both semesters must be completed before credit is given for the first semester. Six credits; one meeting a week, first and second semesters. Mr. Olmsted.
- \*3-4. Intermediate Spanish I-II. Readings from modern authors; grammar review; composition work, with some attention to correspondence and commercial practice if desired by the class. Spanish will be as largely as possible the language of the classroom. Open to those who have had Spanish 1-2. Six credits; one meeting a week, first and second semesters.
- \*20. Spanish Conversation and Composition I-II. Practical conversation including drill in pronunciation and phonetics; composition, including Spanish commercial correspondence. Prerequisite: Spanish 1-2. Six credits; one meeting a week, first and second semesters. Mr. Arjona.
- 65-66. Survey of Modern Literature. Readings in modern authors; lectures in Spanish; study of literary movements. Six credits. (Not offered in 1928-29.)

## SCANDINAVIAN

- \*5. Norwegian Survey I-II. Prose and Poetry. Six credits; one meeting a week, first and second semesters. Mr. Bothne.
7. Beginning Swedish I-II. Grammar, composition, conversation, reading of selected texts. Six credits; one meeting a week, first and second semesters. Mr. Stomberg.
107. Swedish Literature I. Fredrika Bremer and the beginning of the Swedish novel. Representative writers of the nineteenth century. Three credits; one evening a week, each semester. Mr. Stomberg.
109. Swedish Literature III. Representative writers of the present day; lectures, reading of selected authors, and class discussions. Three credits; one evening a week, each semester. Mr. Stomberg.
110. Ibsen. Lectures, reading, interpretation. Three credits; one meeting a week, first semester. Mr. Bothne.

## SOCIOLOGY

- \*1. Introduction to Sociology. The effect upon human society of such influences as geography, sex, race, custom, and invention. Means of controlling and directing these influences. Prerequisite to all other courses in sociology when taken for university credit. Three credits; one meeting a week, each semester. Mr. Lundquist.
- 3. Educational Sociology. A course designed to explain, from the sociological standpoint what the aims of education are, and what subjects are of most value; also designed to show how education can predetermine the institutions of the future. Three credits; one meeting a week, first semester. Mr. Finney.
- \*6. Social Interaction. An examination into the basis and forms of social interaction and social relations, with detailed attention to some of the fundamental behavior patterns of contemporary society. Three credits; one meeting a week, each semester. Mr. Finney.
- \*14. Rural Sociology. The background and evolution of country life; rural conveniences, communication, co-operation; rural social institutions, especially the family, school, church, and social center; rural leadership, surveys, organization, social agencies. Three credits; one meeting a week, first semester. Mr. Lundquist.
- 49. The Occurrence of the Socially Inadequate. The significance of the socially inadequate in contemporary and industrial societies and the description of the methods used in their care. Three credits; one meeting a week, first or second semester. Miss Wheeler.
- 53. Elements of Criminology. The development of the general concept of crime and criminals; the types of criminals; causes of crime; social control of crime; treatment of the criminal; agencies for the prevention of crime. Three credits; one meeting a week, first semester.
- 100. Social Psychology. (Not offered in 1928-29 unless requested.)
- 101. Social Organization. A study of the social mind and its communication, the problems of democracy, of class and caste, of social conflict and revolution, and of social organization on the rational and scientific basis for social efficiency and progress. Lectures, reading, discussion. Course I is a prerequisite if university credit is desired. Three credits; one meeting a week, first semester. Mr. Finney.
- 102. Social Control. A study of the social, psychological, and physical factors which control and direct people in their social relationships. Subjects considered are the origin, evolution, and direction of social control; the means and technique of social control; the growth toward rational and scientific social control under the influence of a developing social science; the limits and purposes of social control. Designed for the same class of students as Course 100. Three credits; one meeting a week, second semester. Mr. Finney.
- 119. The Family. Economic and social problems of the normal family; contemporary problems of family instability. Three credits; one meeting a week, second semester.
- 120. Social Progress. (Not offered in 1928-29 unless requested.)

140. History of Social Thought. (Not offered in 1928-29 unless requested.)  
 141. Contemporary Social Thought. (Not offered in 1928-29 unless requested.)

## SPEECH

(See also under English, pages 24 to 26.)

Students in public speaking will be interested in the course in Parliamentary Law described on page 33.

- \*8ex. Platform Reading I-II. Interpretation and oral expression of the various forms of literature—the essay, the short story, lyric and narrative poetry, and the drama. No credit; one meeting a week, first and second semesters. Mr. Garns.
- 9ex. Story Telling to Children. (1) Story telling, its place and value; (2) choice of the story qualities desirable and undesirable; (3) preparation of the story, application of the short-story ideals of "singleness of impression" and "dramatic struggle"; reconstruction of the story from the child's viewpoint; (4) the problem of delivery—the group consciousness, holding attention, self-effacement, vocal and verbal adaptation. No university credit; one meeting a week, first semester. (Not offered in 1928-29.) Mr. Garns.
- \*41-42-43. General Course in Public Speaking I-II-III. Extemporaneous speaking based on outlines; analysis and organization of speech materials; study of model speeches. Attention is also given to correctness and effectiveness in delivery. This course is designed to meet the practical needs of business and professional students. Nine credits; one meeting a week, first and second semesters. Mr. Rarig, Mr. Bryngelson, Mr. Holmes, Mr. Seering.
61. Speech Correction. This course deals with the abnormal speech problems of adults and children. It includes a study of the physical, mental, and emotional make-up of the child; diagnosing difficulties; prescribing and carrying out treatment. This course is designed primarily for public school teachers and prospective teachers, and parents. Three credits; one meeting a week, each semester. Mr. Bryngelson.
- \*85-86. Advanced Public Speaking I-II. The distinctive characteristics of oratorical style; analysis of the styles of representative orators. Written and extemporaneous speeches. Individual criticism and direction. Six credits; one meeting a week, first and second semesters. Mr. Rarig.
- \*91-92. Play Production I-II. A teacher's course in classroom dramatic interpretation. Six credits; one meeting a week, first and second semesters. Mr. Staadt.

## SWIMMING

Instruction in swimming is given (to women) in the Women's Gymnasium of the University campus, through both semesters, one hour an evening, under competent instructors. The fee is \$5 a semester and a towel fee of ten cents is charged for each meeting. The courses carry no university credit. If a demand arises for classes for men, they will be or-

## EXTENSION CLASSES

ganized in the University Armory. Persons taking the courses are required to conform to the regular university rules in regard to the gymnasium and the pool. Woolen suits are not permitted.

For sanitary reasons a health certificate signed by a reputable physician is required before registration is complete. For this purpose a physician will be at the gymnasium at the first meeting of the class, for whose service a nominal fee will be charged.

\*1ex. Swimming. Beginning and Advanced. Taught by a combination of class instruction and individual instruction. One meeting a week, each semester. Miss Conger, Miss Kaercher, Miss Lane.

## ZOOLOGY

1-2. General Zoology. Structure, physiology, embryology, classification, and evolution of animals. Textbook, lectures, laboratory, and quizzes. Nine credits; two three-hour meetings a week, first and second semesters. Mr. Ringoen.

154ex. Hematology. Lectures and laboratory work on the blood. Considerable time is spent upon the anemic conditions and their relations to the anemic. Designed primarily for practicing medical technicians. No credit; one meeting a week, second semester. Mr. Carr.

## Department of Business Instruction

**Purpose.**—The Department of Business Instruction recognizes the professional status of the business executive. It aims to give prospective executives thoro training for the work they are to undertake. Professional education rather than detailed drill in narrow technical processes is the object toward which instruction is directed. Scientific method in analyzing business data, trained intelligence in dealing with the human relationships with which business is made up, and well-developed sense of moral responsibility will be the foundations of business effectiveness in the future. Experience has proved that those persons whom the department is reaching can, by being actively employed during the day, comprehend and appreciate this course of instruction in a particularly advantageous manner. The courses are conducted in close co-operation with the School of Business Administration of the University.

**Admission to courses.**—Any person may be admitted to extension courses who is sufficiently mature and can satisfy the instructors in whose classes he wishes to register that he is able to carry the work profitably to himself and without hindrance to the class. (See under heading General Information.)

The admission requirements for the School of Business Administration are as follows:

1. Four high school units of English; or three units of English and four units of a foreign language; or three units of English and two units each of two foreign languages.

2. One unit of algebra and one unit of plane geometry, and enough additional work to make in all fifteen units, of which not more than four may be in Group F.

The term unit means not less than five recitations of forty minutes each week for a school year of at least thirty-six weeks. In manual subjects and kindred courses, it means the equivalent of ten recitation periods a week for thirty-six weeks.

A detailed statement of the entrance subjects, grouped into six groups, may be found in the university bulletin of general information. The completion of preparatory courses as above outlined will also be accepted by the State Board of Accountancy as the preliminary high school training required of applicants for the degree of C.P.A.

**Advanced standing in the School of Business Administration.**—Students in the Extension Division who have completed with a grade of "C" the equivalent of three years of one of the four-year programs in the School of Business Administration of the University of Minnesota may obtain the degree of bachelor of science in business by registering in the School of Business Administration for their last year's work. A program of at least thirteen hours per quarter must be carried for the three quarters of the final or senior year. Students interested in the programs of study and graduation requirements of the School of Business Administration should obtain a copy of its bulletin from the registrar.

**Credits and fees.**—The credits are stated throughout in terms of "quarter" hours, and not in "semester" hours as was formerly the practice. One and one-half quarter credits equal one semester credit. The fee for a class which meets once a week in a two-hour session and carries three credits is ten dollars. (For more detailed statement, see under General Information.)

**Certificates.**—Credits earned in this department may be applied toward forty-five- and ninety-credit business certificates and in addition, where the student has satisfied the university entrance requirements, may be applied toward a degree from the School of Business Administration under certain restrictions. (For further information on this subject see the bulletin of the School of Business Administration.)

The requirements for each of these certificates are set forth below. It is possible for a student to obtain two of the certificates listed above, but the second certificate will not be granted until the student has earned an additional 9 credits over the 45 credits required for the first certificate.

**Group course in accountancy.**—This course is designed to meet the needs of two classes of students, namely those who wish to prepare to take the state C.P.A. examinations with a view to becoming public accountants, and those who aim to fit themselves for responsible positions with private business firms as accountants or as managers.

For the student who wishes to pursue either object we recommend that he plan to take the regular course herein outlined and thus secure a broad foundation for his work.

Upon the satisfactory completion of this course, the university certificate in accountancy will be granted.

Students of experience and some maturity may join a class as auditors, in case they do not care to secure credit for the course toward a certificate in accountancy. These students will not be called upon to take part in the discussions nor to turn in work, which is required of students registering for credit. In this way the University hopes to make available the benefits of the courses to those who feel they lack the opportunity or time to do the work regularly required in the course.

Attention is called to the following more specialized courses for those who desire to get the most out of their accounting studies:

- Constructive Accounting
- Accounting Systems
- Interpretation of Accounts
- Interpretative Practice and Procedure
- Business Management
- Functional Problems and Cases in Management

While these courses are not specifically required for a certificate in accounting, it is suggested that they be used as electives where practicable.

The course requires a total of 45 quarter credits, as follows:

Principles of Accounting A (3 credits), Principles of Accounting B (3), Accounting Laboratory A (1½), Accounting Laboratory B (1½), Accounting Practice and Procedure A (3), Accounting Practice and Procedure B (3), Auditing A (3) and Auditing B (3), or Cost Accounting A (3) and Cost Accounting B (3), Business Law A (3), Business Law B (3), Business Law C or D (3), Economics (3), Business English (3), elective subjects (9).

**Group course in banking and finance.**—This course is intended to meet the needs of (1) those who are preparing for, or who are now engaged in, such occupations as banking, corporation management, stock and bond brokerage, credit work, or financial journalism; and (2) business men who wish to utilize in their particular business modern scientific knowledge of practical financial nature.

Beginning with the year 1923-24, the university certificate in finance is granted to those who complete a total of 45 credits distributed as follows:

Principles of Economics (3), Banking and Finance A (3), Banking and Finance B (3), Banking and Finance C (3), Banking and Finance D (3), Business English (3), Principles of Accounting A (3), Principles of Accounting B (3), Accounting Laboratory A (1½), Accounting Laboratory B (1½), Business Law A (3), Business Law B (3), Business Law C or D (3), elective subjects (9).

**Group course in general business.**—For the benefit of students who do not care to specialize in either accounting or in finance, yet wish to secure recognition as having completed a definite group of subjects, the following course is arranged.

The university certificate in general business will be granted to those who successfully complete a total of 45 credits distributed as below.

The electives should be selected with a view to specializing in some particular field, as in advertising and selling, in railroad traffic, and the like.

Business English (3), Business Law A (3), Business Law B (3), Business Law C (3), Business Law D (3), Principles of Accounting A (3), Principles of Accounting B (3), Accounting Laboratory A (1½), Accounting Laboratory B (1½), Economics A (3), Economics B (3), electives (15).

**Ninety-credit secretarial course.**—The subject-matter and sequence in this course have been arranged for those who are preparing for positions as private secretary. The certificate in this course will be granted only to those who present satisfactory evidence as to proficiency in shorthand and typewriting.

	Credits		Credits
English		Technical Office Work	
Business English and Business Correspondence .....	6	Office Technique .....	3
Public Speaking .....	6	Office Management .....	3
Report Writing .....	3	Banking Finance	
Economics		Elementary Money and Banking.....	3
Principles of Economics and Economic Problems .....	6	Statistics or Business Cycles.....	3
Advanced Economics .....	3	Corporation Finance .....	3
Law		Psychology	
Business Law A .....	3	General Psychology I.....	3
Business Law B .....	3	Applied Psychology—Advertising and Salesmanship .....	3
Business Law C		Geography	
or		Human Geography .....	3
Business Law D.....	3	Geography of Commercial Production .....	3
Accounting			69
Principles of Acctg. A and B.....	6	Electives .....	21
Accounting Laboratory A and B....	3	Total .....	90



EXTENSION CLASSES

**Ninety-credit course in management and administration.**—Beginning with the year 1927-28, a university certificate in management and administration will be granted to those who complete a total of ninety credits, which comprise required studies in certain subject groups and electives as follows:

		<i>Accounting</i>	
Required	Credits	Suggested Electives	
Principles of Accounting A and B....	6	Cost Accounting C	
Accounting Laboratory A and B.....	3	Cost Accounting D	
Accounting Practice and Proced. A...	3	Income Tax Problems	
Accounting Practice and Proced. B...	3	Accounting Seminar A and B	
Auditing A .....	3	Constructive Accounting	
Auditing B .....	3	Accounting Systems	
<i>or</i>			
Cost Accounting A .....	3		
Cost Accounting B .....	3		
Interpretation of Accounts.....	3		
Interpretative Pract. and Proced....	3		
<i>Business Law</i>			
Business Law A .....	3		
Business Law B .....	3		
Business Law C .....	3		
Business Law D .....	3		
<i>Banking and Financing</i>			
Money and Banking.....	3	Investments and Stock Exchange	
Financing and Business.....	3	Business Cycles and Forecasting	
<i>English</i>			
Business English .....	3		
Business Correspondence .....	3		
Public Speaking .....	3		
Report Writing .....	3		
<i>Management and Administration</i>			
Elements of Economics.....	3	Business Management	
Economic Problems .....	3	Functional Problems and Cases in Mgt.	
Advanced General Economics.....	3	Railway Traffic and Rates	
Business Management .....	3	Statistics	
Functional Problems and Cases in		Advertising A	
Business Management .....	3	Advertising B	
		Insurance	
		Economics of Retailing	
		Financing of Real Estate	
		Office Technique	
		Office Management	
<i>Psychology</i>			
General Psychology .....	3		
Applied Psychology (Adv. and Sales.)	3		
	—		
Total .....	78		
Electives .....	12		
	—		
Total .....	90		

**Description of subjects offered.**—A complete list of the subjects offered is given below:

## ACCOUNTING

The first year's work consists of, first, a series of lectures and discussions in the principles of accounting; and second, the putting of these principles to practical application in the working out of specific problems. Students not desiring to specialize in accounting may omit this latter course, i.e., Accounting Laboratory A and B; but all who take the laboratory courses are required to take the corresponding courses in accounting principles.

- \*10. Elements of Accounting. A course designed for those who are not prepared by experience or training to enroll immediately in Principles of Accounting, but who desire to overcome their deficiencies and pursue the regular accounting courses. The course will take up the purposes of accounting, the use of books of original entry, posting to the ledger, the trial balance, closing the ledger, preparation of simple trading statements. No credit; one evening a week, first and second semesters in Minneapolis. Mr. Houston.
- \*10L. Elements of Accounting Laboratory. Class work in accounting problems to illustrate subject-matter covered in Elements of Accounting. No credit; one meeting a week, first and second semesters in Minneapolis. Mr. Houston.
- \*25. Principles of Accounting A. Designed to cover fundamentals. Classification of the balance sheet and operating accounts; the books and records of original entry; special discussions on the trading margins, operating expenses, etc.; various bookkeeping and accounting operations, such as accruals, deferred charges; special systems of handling accounting data, such as departmentalization of accounts, imprest cash systems; the treatment of controlling accounts and auxiliary ledgers; preparation of simple working sheets and statements. Three credits; one meeting a week, first semester. Mr. Rotzel, Mr. Heilman, Mr. Blandin, Mr. Houston, Mr. Le Borious, Mr. Smith.
- \*26. Principles of Accounting B. Continuation of Principles of Accounting A with more special reference to manufacturing and corporation accounts; treatment of goodwill and depreciation, accountant's working sheet; adjusting of surplus, sinking funds, and reserve accounts; drafting condensed balance sheets and income statements. Three credits; one meeting a week, second semester. Mr. Rotzel, Mr. Heilman, Mr. Blandin, Mr. Houston, Mr. Le Borious, Mr. Smith.
- \*25L. Accounting Laboratory A. The working out of practical problems covering the subject-matter discussed in Principles of Accounting A, under the guidance of an instructor. One and one-half credits; one meeting a week, first semester. Mr. Blandin, Mr. Culmer, Mr. Le Borious, Mr. Niemackl, Mr. Smith.
- \*26L. Accounting Laboratory B. Work of similar kind covering the subject-matter discussed in Principles of Accounting B. One and one-half credits; one meeting a week, second semester. Mr. Blandin, Mr. Culmer, Mr. Le Borious, Mr. Niemackl, Mr. Smith.
- \*131. Cost Accounting A. A specialized course in manufacturing accounts.

- Chief objectives of the course are, first, the development of principles useful in determining the profitableness of each branch of manufacturing; and second, the establishment of a basis to judge relative efficiencies of operation. Subject-matter includes consideration of materials, labor, and burden; continuous process and production order costs; burden distribution methods, standard costs, etc. Three credits; one meeting a week, first semester. Mr. Rotzel, Mr. Tuttle.
- \*132. Cost Accounting B. A continuation of Course 131. Three credits; one meeting a week, second semester. Mr. Rotzel, Mr. Tuttle.
133. Cost Accounting C (Advanced). A course in cost accounting, enlarging upon the principles laid down in Cost Accounting A and B and directing the student toward the practical application of cost accounting details. Layout of burden centers, development of burden in each burden center, constructive analysis of unearned burden, pro forma journal entries, design of forms, wage methods, means of changing from job to process cost methods, procedure in installing a cost system, round table discussions on elective subjects. Open to students who have completed Cost Accounting A and B or the equivalent. Three credits; one evening a week, first semester. Mr. Tuttle.
- 133a. Cost Accounting D (Advanced). A continuation of Cost Accounting C. Three credits; one evening a week, second semester. Mr. Tuttle.
134. Income Tax Problems. Course offered to those who have completed Principles of Accounting A and B for the purpose of familiarizing the accounting student with the accounting ramifications of the federal income tax law, and its application to various businesses and also to varying business conditions. The purpose of the course also will be to point out possible errors likely to be made in the preparation of the regular tax reports. Lectures, discussions, and working out of problems. Three credits; one meeting a week, first semester.
- \*135. Auditing A. This course is essentially practical and is intended only for those whose previous training in the principles of accounting has been sufficient to enable them to be benefited by this advanced work. The chief aim will be to give students the training necessary to enable them to conduct audits and investigations either as private auditors or public accountants; to set up accounts for various purposes as a result of such audits or investigations and to prepare suitable reports thereon. Three credits; one meeting a week, first semester. Mr. Rotzel.
- \*136. Auditing B. A continuation of Course 135. Three credits; one meeting a week, second semester. Mr. Rotzel.
- \*137. Accounting Practice and Procedure A. An advanced course for the accounting student following the study of accounting principles. The object of the subject is twofold: first, to familiarize the student with the peculiar accounting problems of business; and, second, to afford the student the means to secure that necessary insight and skill which practicing accountants must possess in order to meet the demands made upon them. The work consists of the following: (a) a study of a distinctive group of accounting problems and the scientific solution of these problems; (b) a study of the accounting problems peculiar to

- representative business. Three credits; one meeting a week, first semester. Mr. Rotzel, Mr. Blandin, Mr. Houston, Mr. Le Borious.
- \*138. Accounting Practice and Procedure B. A continuation of Course 137. Three credits; one meeting a week, second semester. Mr. Rotzel, Mr. Blandin, Mr. Houston, Mr. Le Borious.
140. Accounting Practice and Procedure C. Constructive accounting. A course outlining subject-matter relative to the design and installation of a modern accounting system. The make-up of various forms for use in the system, purchase orders, receiving slips, invoices, requisitions, shop tickets, and other forms. The design and ruling of books of original entry; ledgers of various kinds. Three credits; one meeting a week, first semester. Mr. Rotzel.
- \*141. Accounting Practice and Procedure D. Interpretation of accounts. The meaning of accounting reports and statements including balance sheets, income accounts, cost statements, etc. The value of comparison in interpretation. Consideration of the base of comparison. Proper place of statistics in the accounting fabric. Development of accounting ratios and their meaning. Practical problems in the above case method used. Three credits; one meeting a week, first semester.
- \*142. Accounting Practice and Procedure E. Interpretative practice and procedure. The student is here given specific problems to solve and present to the class with the aid of the instructor along the lines of the study of particular cases in interpretation of accounts. Three credits; one meeting a week, second semester.
- \*148. Accounting Practice and Procedure F. Practical accounting systems. Classification of industry according to types of accounting problems. Special features encountered in each class of industry. Constructive, operative, and interpretative features considered. Case methods used. Three credits; one meeting a week, second semester. Mr. Rotzel.
180. Accounting Seminar A. A research course for accounting students who have completed their accounting studies in the Extension Division. During the year 1927-28, an investigation was made of accounting data as a basis for price standards. Three credits; one meeting a week, first semester. Mr. Rotzel.
181. Accounting Seminar B. A continuation of Course 180. Three credits; one meeting a week, second semester. Mr. Rotzel.

#### BANKING AND FINANCE

- Ec.3. Finance A—Money and Banking. Designed as a general descriptive and critical survey of our monetary and banking systems. The nature and functions of our different types of money; the part played by credit in our present economic system and an examination of the character and the operations of each of our various banking and financial institutions. Three credits; one meeting a week, first semester. Mr. Stehman.
- \*Bus. Adm. 150. Finance B—Corporation Finance. The corporate form of financial organization and problems, such as the organization of a

corporation: charters and articles of association; directors and officers, manner of their selection, their functions and responsibilities; forms of corporation stocks and bonds and their respective legal and financial characteristics; the marketing of securities; capital and revenue; intangible values; books and accounts; dissolutions, consolidations, and reorganization; trust and holding companies; the taxing of corporations; corporation statistics; the preparation and analysis of corporation reports; the corporation before the law. Prerequisite: Finance A. Three credits; one meeting a week, second semester, Minneapolis and St. Paul. Mr. Stehman, Mr. Brown.

\*Bus.Adm.146. Finance C—Investments and the Stock Exchange. Bonds, mortgages, stocks, and other forms of property in which funds may be invested, with emphasis on the needs of the conservative investor. The criteria of a good investment are carefully considered and tested by applying them to specific issues of governments, corporations, and individuals, including railroad, industrial, timber, and mining securities, and real estate loans. Stock exchange organizations and operations. Prerequisites: Finance A and B, except that during 1928-29 this course may be taken with Finance A and on condition that Finance B is taken in the second semester, before credit is given for the course. Three credits; one meeting a week, first semester. Mr. Finger.

\*Ec.149. Finance D—Business Cycles and Forecasting. This course aims to give the student: first, a clear understanding of the sequence of events during a business cycle, and how business changes from depression to prosperity, and from prosperity to depression; and second, ability to find, read, and interpret such barometers of conditions as are readily available for determining the exact position of current events in the cycle. Prerequisites: Finance A and B, except that in 1928-29 this course may be taken at the same time that the student is taking Finance B. Three credits; one meeting a week, second semester. Mr. Finger.

Bus.Adm.147. Finance E—Banking Practice. Banking from the administrative point of view; organization of a bank; stockholders and directors; bank departments and their administration; deposits and tellers; bank reserves; circulating notes; checks, the clearing house, and transit department; collections; domestic and foreign exchange; problems involved in granting loans; credit department; how banks make a profit; accounting methods; the Federal Reserve System. Prerequisite: Finance A, except that during 1928-29 this course may be taken at the same time as the student is taking Finance A. Three credits; one meeting a week, first semester. Mr. Finger.

Bus.Adm.145. Finance F—Foreign Trade and Foreign Exchange. The Middle West produces almost half of the goods exported from the United States. This course is designed to give a working knowledge of the foreign markets for our goods, how to get in touch with them, and the mechanism of foreign exchange which is used in paying and collecting for goods sold. A thoro discussion of foreign exchange, fundamentals as well as practice, and current foreign developments as they affect the foreign exchange market. Prerequisites: Finance A and E. Three credits; one meeting a week, second semester.

## BUSINESS ENGLISH

- \*81. Business English. A practical course designed for business men and women who recognize the value of a command of English for business and everyday writing and conversation. The types of letters to be studied include adjustment, acknowledgment, recommendation, application, collection, follow-up, sales, and interdepartmental. Ability to write simple, grammatically correct English is a prerequisite. No credit toward a degree, three credits for a certificate in business; one meeting a week first semester, repeated second semester. Mr. Ambler, Mr. Conley, Mr. Creamer.
- \*82. Business Correspondence. This course logically follows Business English 81. Less stress is placed upon grammar and more upon the general principles underlying successful letter writing. Students who have not had Course 81 will be admitted to this course upon the recommendation of the instructor. No credit toward a degree, three credits for a certificate in business; one meeting a week, second semester. Mr. Ambler, Mr. Conley, Mr. Creamer.

## BUSINESS LAW

The courses in Business Law are designed not merely to give a knowledge of the fundamental principles of law which should be known to every well-informed person, but particularly to aid the business or professional man in his practical legal problems. The credits may be applied in the College of Science, Literature, and the Arts, and as general academic credits in other colleges, but cannot be accepted as professional credits toward the degree of bachelor of laws.

- \*51. Business Law A—Contracts and Agency. A brief introduction to the study of law with a general consideration of legal rights and remedies, followed by a more detailed survey of two subjects which are the legal basis for most business transactions. (1) Contracts—their formation, interpretation, operation, transfer and discharge, with some consideration of the Statute of Frauds. (2) Agency—the creation, nature, and termination of the relation; rights and liabilities of the parties. Three credits; one meeting a week, first semester; repeated in the second semester. Mr. Chapin, Mr. Jackman.
- \*52. Business Law B—Personal Property, Negotiable Instruments. A brief consideration of the nature of personal property; various transactions concerning it, and followed by a more detailed study of the law of sales, bailments, and of the Uniform Negotiable Instrument Act and the Uniform Bills of Lading Act. Prerequisite: Business Law A. Three credits; one meeting a week, second semester. Mr. Chapin, Mr. Jackman, Mr. Kitts, Mr. Palmer.
- \*53. Business Law C—Business Organizations, Insolvency, and Bankruptcy. The organization, management, and responsibility of associations, business trusts, and special attention to the law of partnership and corporations. The Uniform Partnership Act, the Uniform Limited Partnership Act, and the Federal Bankruptcy Act are studied. Pre-

requisite: Business Law A. Three credits; one meeting a week, first semester. Mr. Jackman, Mr. Palmer, Mr. Rumble.

- \*54ex. Business Law D—Real Estate, Mortgages. The nature and classification of estates in land; deeds and conveyances; landlord and tenant; recording and abstracting; Torrens titles; liens and mortgages; wills and the probate of estates together with the duties of executors and administrators. Prerequisite: Business Law A. Three credits; one meeting a week, second semester. Mr. Jackman, Judge Bardwell, Mr. Palmer, Mr. Rumble.
- \*7ex. Parliamentary Law. For description see Parliamentary Law on page 33. No college credit; one meeting a week, each semester. Mr. Hawley.

### ECONOMICS AND ADMINISTRATION

(See also Economic History, page 29.)

- \*6. Principles of Economics I. Introduction to the study of principles underlying the economic activities of society. This class should be followed by Principles of Economics II to make a complete unit. Three credits; one meeting a week, first semester. Mr. Myers, Mr. Graves.
- \*7. Principles of Economics II. Continuation of Principles of Economics I. A study of principles essential to the solution of such current problems as the business cycle and industrial depressions, taxation, labor organizations, combinations and monopoly, immigration, international trade, and others. Prerequisite: Principles of Economics I. Three credits; one meeting a week, second semester. Mr. Myers, Mr. Graves.
85. Economics of Retailing. A course in retail merchandising and store management. Class work consists of discussions of problems actually encountered in retail stores. The problems presented cover the following topics: (1) store organization, location, and equipment, (2) stock purchase and control, (3) merchandise classification and layout, (4) administrative policies as to personnel and in relation to general business conditions. Three credits; one meeting a week, first semester. Mr. Vaile.
- \*101. Advanced General Economics. A course in advanced economic theory, dealing chiefly with the theories relating to value. Considers the application of certain economic principles to current business problems from both the social and individual viewpoint. Critical analysis of such problems as, the economists' explanation of demand, relation of cost to the supply of products, the determination of prices under conditions of competition and monopoly, and differences in costs, between firms. Three credits; one meeting a week, first semester. Mr. Waite.
135. Methods of Price Forecasting. A survey of the methods of study of the forces determining prices, forecasting price changes, and determining "established prices." The application of principles to particular cases. Deals largely with the prices of agricultural products. Three credits; one meeting a week, second semester. Mr. Waite.
166. Contemporary Economic Problems. Practical appreciation of the principles of economics in the study of selected outstanding problems

- of the day, such as stabilization of the price level, Federal Reserve re-discount policy, industrial fluctuations, the economic consequences of war, international trade barriers, distribution of wealth and income, and others. Prerequisite: Principles of Economics II. Three credits; one meeting a week, each semester. Mr. Myers.
- \*14. Statistics. Designed to familiarize students with the principles of statistical methods and their practical use in business. A study is made of the selection, tabulation, and interpretation of statistical data. The student is taught the construction and use of graphs, charts, and index numbers. Three credits; one meeting a week, first semester. Mr. Graves.
- \*89. Business Management. Place of management in the field of business; business organizations, internal and financial; functions of business; principles of plant location; analysis of the functions of business; types of operating organizations; use of graphs in management; qualifications of executives; compensation of labor; waste in industry considered. Three credits; one meeting a week, first semester.
- \*90. Functional Problems and Cases in Management. Operating laws. Administrative problems; promotion, management, and operating management contrasted. Sales and production policies. Practical problems in management and policies. Consideration of the human element. Aid given by accounting in making managerial decisions. Three credits; one meeting a week, second semester.
100. Report Writing. Lectures and conferences upon the preparation of theses and reports. Actual preparation of reports in connection with studies in auditing, accounting, economics. Three credits; one meeting a week, first semester. Mr. Heilman.
86. Office Technique. Layout and arrangement of office equipment; kinds of office equipment and their uses; handling of files and routing of work; filing methods and organization. Lectures and discussion. Three credits; one meeting a week, first semester.
87. Office Management. A study of office work and results required in typical business and other offices. Control of incoming and outgoing mail; the city desk; telephone; the relation of executives to the office management problem. Specific cases discussed and analyzed. Three credits; one meeting a week, second semester.
- \*59. Life Insurance. Personal and business uses of life insurance; types of contracts; the mortality table; calculation of premiums, reserves, and dividends; state laws and supervision. Three credits. (Not offered in 1928-29.) Mr. Graves.
61. Salesmanship. A class for specialty and traveling salesmen. Lectures and demonstrations on the principles underlying salesmanship, as follows: buying motives; pre-approach work; the approach; handling the interview; meeting objections; closing the sale. One of the features of the work will be demonstration sales, in which students will be given an opportunity to act as "salesman" and "customer." No credit for degree; three credits for certificate in general business; one meeting a week, each semester. Mr. Conley.



- \*73. *Railway Traffic and Rates.* A practical study of the Act to Regulate Commerce and the other laws and regulations covering the transportation of property, locally and in foreign commerce, both by rail and by water. The student is acquainted with the correct compilation and interpretation of freight tariffs and economical and efficient methods in shipping. The lectures are comprehensive and embrace rate making bases, the classifying and tracing of freight, the preparation of claims, etc. Rulings of the Interstate Commerce Commission and of the various state commissions are referred to and rates are quoted from current tariffs and classifications. Six credits; one meeting a week, first and second semesters. Mr. Crellin.
- \*88A. *Advertising A.* An elementary course in advertising, covering: the development of advertising and the place of modern advertising in business; the appeals used in advertising; the principles of layout and arrangement, including proper placing of headlines, borders, and other display elements; typography; illustrations; and advertising copy. Students will be given practice in the layout of advertisements and writing copy. No credit for a degree, three credits for a certificate in business; one meeting a week, first semester.
- \*88B. *Advertising B.* A continuation of Advertising A. This course includes more intensive work in layout and copy writing with additional practice in these phases of the work; characteristics and selection of advertising media; the principles involved in the preparation of advertising campaigns, including the study of the product; analysis of the market and competition; the advertising appropriation; selection of media; methods of identification; co-ordinating with the complete campaign. No credit for degree, three credits for a certificate in business; one evening a week, second semester.
- \*1ex. *Retail Advertising.* A systematic presentation of the retail advertising problem from the study of merchandise features to be advertised to layout and copy. The course is built upon practical principles and includes the planning of all art. No credit for degree. Three credits for a certificate in business; one meeting a week, first semester. Mr. Gooris.

#### GEOGRAPHY

- 51A. *Human Geography.* Three credits; one meeting a week, first semester. Mr. Davis, Mr. Everly.
- 51B. *Human Geography.* Three credits; one meeting a week, second semester. Mr. Davis, Mr. Everly.
- 61A. *Geography of Commercial Production.* Three credits; one meeting a week, first semester. Mr. Davis.
- 61B. *Geography of Commercial Production.* Three credits; one meeting a week, second semester.

For description of these courses see under Geography, pages 26-27.

#### TEXTILES

3. *Textiles.* Three credits; one meeting a week, first semester. Miss Caplin.

For description of this course see under Textiles, page 29.

## Department of Engineering and Architectural Instruction

**Purpose.**—The General Extension Division now offers groups of courses in (1) architecture, (2) civil engineering, (3) electrical engineering, and (4) mechanical engineering. These groups are arranged to be completed in from four to six years and are planned primarily for persons who are employed during the daylight hours. A mastery of engineering requires the student to pursue a certain sequence of courses in their proper order. Mathematics is the foundation of the whole profession. All of the mathematics courses should be finished before the more advanced engineering courses are attempted. These courses have been laid out with care and are especially adapted to the needs of men working in shops and industrial establishments. They are planned so that such men may have added to their practical training a technical and theoretical knowledge which will enable them to advance more rapidly in their chosen line of work. These courses also offer an opportunity to college graduates who may wish to specialize in some subject not covered in their regular college work.

**Credits and fees.**—When 45 credits of engineering work have been completed, the Extension Division grants a certificate in engineering. When 90 credits of engineering work have been completed, the Extension Division grants an advanced certificate in engineering. Extension courses in engineering carry credit toward a degree in the College of Engineering and Architecture as a result of the comprehensive examinations conducted by that college. In the past meritorious students have not found this provision burdensome.

**Group course certificates.**—Upon the completion of 45 credits in any of the group courses, a certificate in the group subject will be granted and upon completion of 90 credits in any one of the groups of courses indicated above, an advanced certificate in the group subject will be granted by the University of Minnesota. Requests for advanced standing must be accompanied by a transcript of the work done, otherwise the fitness of a student to omit any part of the work must be determined by a comprehensive examination in the subject for which he desires credit. At least 30 per cent of the credits toward certificates must be earned in the extension classes of the University of Minnesota.

The following groups of courses can be completed in four years by devoting three evenings a week to class work. Students may, however, adapt the number of evenings a week to their own specific circumstances, bearing in mind that the minimum number of credits required for the first certificate is 45, and the advanced certificate is 90.

**Group course in architecture.**—The course in architecture in the Extension Division affords a training in the general practice of architecture for those who are employed during the major part of their time and for teachers in the public schools. While adequate attention is given to

structural studies, the course lays particular stress on the study of architectural design. It leads to a certificate in architecture on the completion of 45 credits, and an advanced certificate on completion of 90 credits as outlined below.

First Semester	Second Semester
Elements of Architecture I	Elements of Architecture II
Freehand Drawing I	Freehand Drawing II
Trigonometry I	Trigonometry II
Architectural Design I	Architectural Design II
Freehand Drawing III	Freehand Drawing IV
Analytic Geometry I	Analytic Geometry II
Architectural Design III	Architectural Design IV
History of Architecture I	History of Architecture II
Applied Mechanics	Structural Design
Strength of Materials	Reinforced Concrete
Architectural Design V	Architectural Design VI
Introduction to the Theory of Engineering	Heating and Ventilating
Architectural Construction I	Architectural Construction II

**Group course in chemical engineering.**—For students interested in a certificate in chemical engineering, the following list is offered.

First Semester	Second Semester
Trigonometry I	Trigonometry II
Inorganic Chemistry I	Inorganic Chemistry II
English IV	English V
College Algebra I	College Algebra II
Analytic Geometry I	Analytic Geometry II
Qualitative Chemistry	Quantitative Chemistry
Calculus I	Calculus II
Mechanical Drawing I	Mechanical Drawing II
Physics I	Physics II
Calculus III	Calculus IV
Organic Chemistry I	Organic Chemistry II
Technical Mechanics	Strength of Materials

**Group course in civil engineering.**—The course in civil engineering has been prepared for men who desire to specialize in this branch of the profession. It deals with the fundamentals of civil and structural engineering and is designed to fit men for either field or office work.

There are certain options allowed the student depending largely upon the work he intends to follow. This information must be furnished the Extension Division at the time the student registers and his options will then be given him. A certificate is granted on the completion of 45 credits and an advanced certificate on the completion of 90 credits as outlined below.

**Group course in civil engineering (continued).**

First Semester	Second Semester
Shop Mathematics I	Shop Mathematics II
Mechanical Drawing I	Mechanical Drawing II
Physics I	Physics II
Shop Mathematics III	Shop Mathematics IV
Applied Mechanics	Strength of Materials
Structural Drafting I	Structural Drafting II
Trigonometry I	Trigonometry II
Plane Surveying I	Curves and Earthwork
Elementary Structural Design I	Structural Design II
Concrete Tests I	Steel Tests I
Differential Calculus	Integral Calculus
Reinforced Concrete Design I	Reinforced Concrete Design II
Highways and Pavements I	Highways and Pavements II
Hydraulics	Water Power

**Group course in electrical engineering.**—The purpose of this course is to give the student a foundation in the fundamental principles of electricity together with a sufficient knowledge of professional practice to enable him to apply them in his daily work. The course is designed with special consideration for those already employed in the electrical industries. A certificate is granted on the completion of 45 credits and an advanced certificate on the completion of 90 credits as outlined below.

First Semester	Second Semester
Shop Mathematics I	Shop Mathematics II
Mechanical Drawing I	Mechanical Drawing II
Physics I	Physics II
Shop Mathematics III	Shop Mathematics IV
Direct Current I	Direct Current II
Direct Current Laboratory I	Direct Current Laboratory II
Applied Mechanics	Strength of Materials
Trigonometry I	Trigonometry II
Alternating Currents I	Alternating Currents II
Alternating Currents Laboratory I	Alternating Currents Laboratory II
Differential Calculus	Integral Calculus
Transformed Design	Motor Design
Central Stations	Power Transmission
Radio Communication I	Radio Communication II

**Group course in mechanical engineering.**—The course in mechanical engineering is designed for men employed as operating engineers as well as to fit men for such positions. It has been prepared and is taught by men who had practical experience in their fields. There is a continual demand for operating men to fill executive positions and to meet this demand the following course has been prepared. Certain options as indicated below are allowed and a certificate is granted on the completion of 45 credits and an advanced certificate on the completion of 90 credits as outlined below.

**Group course in mechanical engineering (continued).**

First Semester	Second Semester
Shop Mathematics I	Shop Mathematics II
Mechanical Drawing I	Mechanical Drawing II
Physics I	Physics II
Shop Mathematics III	Shop Mathematics IV
Mechanical Drawing III	Mechanical Drawing IV
Applied Mechanics	Strength of Materials
Trigonometry I	Trigonometry II
Machine Design I	Machine Design II
Boiler Room Practice	Engine Room Practice
Differential Calculus	Integral Calculus
Machine Design III	Machine Design IV
Elementary Thermodynamics	

**Advanced courses in engineering.**—From time to time as occasion demands advanced courses in the following subjects are offered:

**MATHEMATICS AND MECHANICS**

First Semester	Second Semester
College Algebra I	College Algebra II
Analytic Geometry I	Analytic Geometry II
Differential Calculus I	Differential Calculus II
Integral Calculus I	Integral Calculus II
Differential Equations I	Differential Equations II
Advanced Mechanics I	Advanced Mechanics II

**CIVIL ENGINEERING**

First Semester	Second Semester
Highways and Pavements I	Highways and Pavements II
Advanced Surveying	Map Drawing
Advanced Reinforced Concrete I	Advanced Reinforced Concrete II
Hydraulics	Water Power
Construction Cost Estimating	Economics of Engineering Costs
Advanced Structural Design	

**ELECTRICAL ENGINEERING**

First Semester	Second Semester
Central Stations	Electrical Power Transmission
Electrical Transformer Design	Induction Motor Design
Advanced Radio Communication	Telephony

**MECHANICAL ENGINEERING**

First Semester	Second Semester
Production Factors	Thermodynamics
Advanced Automotives	Foundry Practice
Lubricating Oils	Gasoline, Oil, and Diesel Engines

**CHEMISTRY AND METALLURGY**

First Semester	Second Semester
General Inorganic Chemistry	Metals and Qualitative Analysis
Quantitative Analysis	Quantitative Analysis
Metallography and Heat Treatment of Steel	Advanced Metallography
	Petroleum and Petroleum Products

**Description of courses in engineering and architecture.**—A detailed description of the courses in engineering offered through the Extension Division is given below.

## ARCHITECTURE

- \*24-25-26. Freehand Drawing I and II. For description, see Art, under College of Science, Literature, and the Arts, page 20. Six credits; one meeting a week, first and second semesters. Mr. Burton. Mr. Doseff.
- \*27-28-29. Freehand Drawing III and IV. Continuation of I and II. For description, see Art, under College of Science, Literature, and the Arts, page 20. Six credits; one meeting a week, first and second semesters. Mr. Burton.
- \*30-31-32. Freehand Drawing V-VI. For description see Art, under College of Science, Literature, and the Arts, page 20. Six credits; one meeting a week, first and second semesters. Mr. Burton.
- \*31-32-33ex. Elements of Architecture I-II. Shades, shadows, and wash rendering. Architectural elements, doors, windows, moldings, and the architectural orders; general drawing, exercises, and lectures in the application of these elements to simple problems in design; a survey of architectural history. Open to students who have had mechanical drawing, or those who have had one year in an architect's office, or equivalent experience. Six credits; two meetings a week, first and second semesters. Mr. Deneen.
- \*‡34-35-36. Architectural Design I-II. Regular Class B "Analytique" or order problems of the Society of Beaux Arts Architects, or equivalent designs in architectural problems from the regular course of the University of Minnesota. Open to those who have completed Course 31-32-33ex, or who have had two years in an architect's office, or equivalent preparation in an architectural school. Six credits; two meetings a week, first and second semesters. Mr. Deneen.
- \*‡37-38-39. Architectural Design III-IV. Class B, plan problems, and Class A, problems of the Society of Beaux Arts Architects, or equivalent design problems from the regular course in architecture at the University of Minnesota. Open only to those who have completed the required "Analytique" or order problems, one or more years of design in any architectural school. Six credits; two meetings a week, first and second semesters.
- 51-52-53. Architectural Construction I-II. Nature and use of building materials—wood, brick, stone, concrete, steel, etc. Lectures. Six credits; one meeting a week, first and second semesters. (Not offered in 1928-29.)
- ‡131-132-133. Architectural Design V-VI. Long, short, and sketch problems done under individual criticism dealing in general and more complex kinds of architectural composition with subjects involving special character and a decorative and imaginative interest. Prerequisite: Architectural Design III and IV. Six credits; two meetings a week, first and second semesters. (Not offered in 1928-29.) Mr. Mann.

‡ Regular instruction will be given on Monday and Thursday evenings, but students in these classes may work in the drafting rooms of the Architectural Department on other evenings, except Sunday.

## CHEMICAL ENGINEERING

(See also under Chemistry, page 21-22.)

- 10ex. Petroleum and Petroleum Products. A discussion of the various petroleum products, their tests, significance and importance of such tests and their relation to every phase of engine lubrication and operation. A discussion of the chemistry of these products as far as it is known at present. Of interest to salesmen, oil inspectors, and testing chemists. Four credits; one meeting a week, consisting of a two-hour lecture and a one-hour laboratory demonstration, second semester. Mr. Harding.

## CIVIL ENGINEERING

- \*11. Plane Surveying. Elements of plane surveying, methods of chain, compass, transit, and stadia surveys; leveling; field notes; determination of area of irregular plots; computation and plotting of field notes; care, use, and adjustment of instruments; methods of subdivision of the United States public lands. Prerequisite: Trigonometry. Three credits; one meeting a week, first semester. Mr. Cutler, Mr. Teeter.
21. Curves and Earthwork. Mathematics of simple, compound, and spiral curves; plotting of profiles; vertical curves; cross sectioning and computation of earthwork volumes; methods of computing overhaul; mass diagram. Prerequisite: Trigonometry and Plane Surveying. Three credits; one meeting a week, second semester. Mr. Cutler, Mr. Teeter.
22. Curves and Earthwork—Special Problems. A continuation of Course 21. More detailed study of use of mass diagram; volumes of borrow pits, gravel pits, etc.; turnouts, etc. Special problems to meet the needs of the individual student. Prerequisite: Course 21 or its equivalent. Three credits; one meeting a week, either semester. Mr. Cutler, Mr. Teeter.
- \*31-32-33. Structural Design I-II. Includes a treatment of structural mechanics and stress computation, and the elements of the principles and practice governing the design of tension and compression members, beams, girders, columns, trusses, and their connections. Prerequisite: an elementary working knowledge of mathematics through trigonometry, and some knowledge of elementary physics. Six credits; one meeting a week, first and second semesters. Mr. Edwards, Mr. Darrell.
- \*141. Elementary Reinforced Concrete. A rapid review of the fundamental principles of beams and columns; elementary principles of reinforced beams, slabs, and columns. Prerequisite: Strength of Materials. Three credits; one meeting a week, first semester. Mr. Teeter.
- \*142. Reinforced Concrete Design I. Design of ribbed slabs and flat slab floors. Spandrel and wall beams, stairways, and special framing. Single and combined column footings. Cantilever and counterfort retaining walls. Prerequisite: Elementary Reinforced Concrete, 141. Three credits; one meeting a week, second semester. Mr. Wise.

135. Reinforced Concrete Design II. Analysis of statically indeterminate structures. Slope-deflection method applied to reinforced concrete structures. Design of building as rigid frame. Wind stresses. Bending in columns. Design of tanks, bins, irregular, and unsymmetrical girders, frames, and towers. Prerequisite: Reinforced Concrete Design I. Three credits; one meeting a week, first semester. Mr. Wise.
- \*143. Reinforced Concrete Arch. Analysis of reinforced concrete arch. Approximations to ideal curve, and trial designs. Live load influence lines. Temperature and rib-shortening stresses. Design of arch sections. Form work and erection problems. Temporary flexural hinges and rib compensation methods for long span arches. Prerequisite: Reinforced Concrete Design II. Three credits; one meeting a week, second semester. Mr. Wise.
- \*146. Concrete and Concrete Materials. The selection of materials for concrete, their properties and the tests to be applied. Discussion of modern principles and methods used in manufacturing concrete. Experimental work to demonstrate these principles. All experimental work will be done by the students. Prerequisite: Shop Mathematics I and II. Three credits; one meeting a week, first semester. Mr. Hughes.
- \*147. Concrete and Steel Structures: Tests and Analysis. Study of the strength and carrying capacity of bridges and buildings; methods of testing in the field; special types of extensometers used and tests of laboratory models and buildings in actual service. Prerequisite: Concrete Materials 146. Three credits; one meeting a week, second semester. Mr. Hughes.
245. Advanced Reinforced Concrete Design. The theory and design of structures, for graduate students. Reinforced concrete arches, framed structures, continuous beams, culverts, and circular pipes, statically indeterminate methods, moments and shears, application of the most recent development in reinforced concrete design methods and materials. Prerequisite: Reinforced Concrete Design 142. Three credits; one meeting a week, either semester. Mr. Parcel.
- \*51-52. Highways and Pavements I-II. Elementary economics, location, construction, and maintenance of highways and pavements, a study of road building materials and methods of testing with laboratory practice. Six credits; one meeting a week, first and second semesters. Mr. Lang.
129. Hydraulics I-II. Mechanics of liquids, pressure in pipes, on gates and dams, flow through pipes and open channels, water hammer; the basic principles of centrifugal pumps and water wheels. Prerequisite: Strength of Materials and trigonometry. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards.
162. Water Power and Elements of Hydrology. Types of low, medium, and high head developments. Details of developments; spillway dams; hollow reinforced concrete dams, arch dams, high masonry dams, movable dams. Turbine settings and characteristics. Prerequisite: Hydraulics 129. Six credits; one meeting a week, first and second semesters. Mr. Teeter.



## ELECTRICAL ENGINEERING

- \*111-113. Direct Current Machinery I-II. Elementary electricity, the simple laws of magnetism, the theory of direct current machinery; direct current motors and generators, armature windings, commutation, and wiring diagrams; of value to those who work with direct current apparatus, a foundation for the study of alternating current machinery and power plants. Prerequisites: Practical Physics 51ex and Trigonometry 12. Six credits; one meeting a week, first and second semesters. Mr. Edwards, Mr. Todd.
- \*112-114. Direct Current Laboratory I-II. A course of experimental work to aid in understanding direct current theory. The laws of magnetism and direct current circuits illustrated in experiments performed by the student himself. Machine characteristics for several types of motors and generators. Prerequisite: registration in Direct Current Machinery, Practical Physics 51ex, and Trigonometry 12. Six credits; one meeting a week, first and second semesters.
- \*121-123. Alternating Currents I-II. An elementary course in alternating current circuits and machines; series and parallel circuits, single and polyphase systems, power and power factors, transformers, induction motors, alternators, synchronous motors, rotaries, single phase motors, and transmission lines. Prerequisite: Direct Current Machinery 111-113 and Direct Current Laboratory 112-114. Six credits; one meeting a week, first and second semesters. Mr. Edwards, Mr. Johnson.
- \*122-124. Alternating Currents Laboratory I-II. Supplementary to Alternating Currents 121-123. An experimental study of alternating currents, regulation and efficiency tests of alternators, transformers, motors, and rotaries. Prerequisite: registration in Alternating Currents 121-123. Six credits; one meeting a week, first and second semesters. Mr. Kuhlman.
- 132-134. Electrical Machine Design I-II. The design of transformers, alternators, motors, and generators, the calculation of all dimensions and predetermination of operating characteristics. Prerequisite: Alternating Currents I-II, Mathematics VI, and Mechanical Drawing II. Six credits; one meeting a week, first and second semesters. Mr. Kuhlman.
141. Central Stations. The economics of electric-power generating and distributing systems; demand, diversity, and load factors, load diagrams; voltage regulation; protective apparatus; selection of prime movers and units; methods of charging and metering; maintenance of plants; emergencies. Three credits; one evening a week, first semester. Prerequisite: Alternating Currents 121-123. Mr. Ryan, Mr. Johnson.
142. Electrical Transmission. The economics involved in the designing and building of transmission lines, Kelvin's law and its limitations, the transmission line as a mechanical structure, lightning arresters, study of particular high tension lines. Three credits; one meeting a week, second semester. Prerequisite: Mechanical Drawing II, Courses 134 and 141. Mr. Ryan, Mr. Johnson.

- \*66. Radio Communication I. Analysis of the theory and operation of radio transmitting and receiving circuits, with emphasis on the various types of receiving sets now in use; economic status of radio communication. Prerequisite for credit: College physics and trigonometry or equivalent. Three credits; one meeting a week, first semester. Mr. Sweet.
- \*67. Radio Communication II. Continuation of prerequisite Course 66 or equivalent. Three credits; one meeting a week, second semester. Mr. Sweet.
- 161-162-163. Advanced Radio Communication III-IV. Phase relations in high frequency circuits; theory of damped wave circuits; inductance and capacity measurements; the electron tube; undamped wave transmitting and receiving circuits; heterodyne reception; sources of high frequency power. Design of electron tube oscillator and amplifier circuits. Radio telephone modulation, carrier frequencies. Prerequisite: registration in Calculus and Alternating Currents I-II. Six credits; one meeting a week, first and second semesters. Mr. Sweet.
- 81ex. Electrical Instruments and Meters. This course will cover a study of types of indicating instruments, both direct and alternating current, including electromagnetic, magnetoelectric, electrodynamic, thermoelectric, hot wire electrostatic, etc. A study will be made of voltmeters, ammeters, and wattmeters and special applications of electrical principles to measuring instruments outside of the electrical field to a limited degree. A study will be made of curve drawing graphic instruments, and integrating watt-hour meters, etc. Six credits; one meeting a week, first and second semesters. Mr. Todd.

## ENGINEERING DRAWING

- \*1-2. Elementary Mechanical Drawing I-II. A beginning course in drawing; use of instruments and drawing materials, lettering, tracing, view drawing, dimensioning, and working drawings of simple machine parts. No prerequisite. No previous drawing instruction or experience necessary. Six credits; one meeting a week, first and second semesters. Mr. French, Mr. Dow, Mr. De Freece.
- \*45ex. Teachers' Course in Mechanical Drawing I-II. A special course offered to those who teach drawing in grade and high schools and who wish better to acquaint themselves with standard drafting room practice. Six credits; one meeting a week, first and second semesters. Mr. French.
- \*46ex. Mechanical Drawing for Women I-II. Similar to Course 1-2, with more emphasis on lettering and tracing at the option of the student. Six credits; one meeting a week, first and second semesters. Mr. French.
81. Construction Cost Estimating I. Labor and material costs. Reading of building and construction plans. Quantity surveying. Calculation methods. Instruction in use of slide rule optional with class. Cost estimates of typical structures in concrete, brick, timber, steel, etc. Miscellaneous costs. Knowledge of mechanical drawing not essential. Three credits; one meeting a week, each semester. Mr. French.

- 48ex. Plan Reading I-II. This is the same as Elementary Mechanical Drawing I and II except that plates will be drawn in pencil only. Full set of instruments not required. (Reading of building and construction plans is given in Cost Estimating Course 81, which see.) Six credits; one meeting a week, first and second semesters. Mr. French.
- \*15. Structural Drafting. A practical course in structural steel detailing. Fabrication and erection drawings of beams, girders, columns, and trusses. Complete shop drawings of a mill building or similar structure. Solution of problems of simple structures. Prerequisite: Mechanical Drawing I-II. Three credits; one meeting a week, first semester. Mr. French, Mr. Herrick, Mr. De Freece.
- \*31-32. Advanced Mechanical Drawing I-II. A practical course in drafting and drafting room methods taking up the detail of machine parts, such as fastenings, screws, bolts, rivets, and rivet joints; keys, cotters, and pins; pipe and pipe fastenings; bearings and journals, pulleys and belting; gears; cams, etc.; the application of empirical design and the principles of mechanics; assembly, diagrammatic and layout drawings. It is assumed that the student has a previous knowledge of drawing equivalent to Course 1-2. Six credits; one meeting a week, first and second semesters. Mr. Herrick, Mr. Dow, Mr. De Freece.
- 32ex. Gear Drawing. A course in development of gear teeth by the drafting room method. Study of curves used in gear teeth, sprockets, and chain wheels. Layouts of involute, cycloidal, and other forms for spur, annular, stub, bevel, worm, spiral, herringbone, and various other types of gear. Simple calculations to determine pitch, number of teeth, pitch diameter, etc. Prerequisite: Mechanical Drawing 31 or its equivalent. Three credits; one meeting a week, each semester. Mr. Herrick.
- \*33. Mechanism and Kinematics. A study of motion without the consideration of the strength of parts; levers, gearing, linkwork, kinematic pairs; machine parts; construction of tooth profiles; paths and velocities of mechanism. Prerequisites: a previous knowledge of drawing equivalent to Course 1-2. Three credits; one meeting a week, each semester. Mr. Herrick.
- 34ex. Cam Drawing. A drawing course in the laying out of different types of cams; such as mushroom, face, wiper, rolling, yoke, cylinder, etc. Cam curves constructed on the straight line base, straight line combination curve, crank curve, parabola and elliptical curve. Problems in special cases. Three credits; one meeting a week, each semester. Mr. Herrick.
- \*35-37. Machine Design I-II. An elementary course in the calculation and design of machines and machine parts, such as machine frames, shafting, flywheels, pulleys, riveted and screwed fastenings, bearings, spur gearing, bevel gearing, and helical gearing. Lectures and drawing room practice of practical problems. Prerequisites: previous knowledge of drawing equivalent to Course 1-2, and mathematics through trigonometry; a working knowledge of Elementary Physics and Strength of Materials is desirable. Six credits; one meeting a week, first and second semesters. Mr. Herrick, Mr. Edwards.

## MATHEMATICS AND MECHANICS

For other courses in mathematics, see under Mathematics, pages 30-31.

- \*7. Shop Mathematics I and II. A general review of all elementary mathematics through geometry. Designed as an introductory course to meet the needs of anyone who wishes to take up engineering work of a higher grade. The course covers fractions, decimals, percentage, weights of materials, areas and volumes, thread cutting, gearing, belts and pulleys, the milling machine, and a general drill in equations and the use of formulae, elements of algebra, and plane geometry. Six credits toward an extension certificate, one meeting a week, first and second semesters. Mr. Teeter, Mr. Dow, Mr. Edwards, Mr. Ringsred.
9. Shop Mathematics III and IV. Higher Algebra. A continuation of Shop Mathematics I and II, including simultaneous equations, progressions, logarithms, theory of exponents, variation, quadratic equations, and graphical algebra. Prerequisite: Shop Mathematics II. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Dow, Mr. Edwards, Mr. Ringsred.
- \*11. College Algebra I and II. A course of college grade in fundamental rules, fractions, linear simultaneous equations, graphs, theory of exponents, surds, complex quantities, quadratic equations, indeterminate equations, ratio, proportion, variation, theory of equations, Horner's and Newton's methods. Textbook: Hall and Knight. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards, Mr. Wilcox.
- \*12. Trigonometry I and II. A course of college grade in trigonometry.. A study of angles, trigonometric functions, plane right angles, reduction formulae, fundamental relations, other trigonometric relations, identities and equations. Inverse functions, plane oblique triangles, De Moivre's theorem, trigonometric functions used in spherical trigonometry, spherical right triangles, quadrantal triangles. Textbook: Bauer and Brooke's, *Plane and Spherical Trigonometry*. Prerequisite: college algebra. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Edwards, Mr. Hartig.
- \*13. Analytic Geometry (plane and solid) I and II. Of great importance to the engineering student who wishes to take up the study of calculus. The straight line, circle, ellipse, parabola, hyperbola, tangents, normals, rotation of axes, and a few of the higher plane curves met with in practice. Space co-ordinates, plane, line and quadric surfaces, cylinders, and space curves. Prerequisite: Trigonometry I and II. Six credits; one meeting a week, first and second semesters. Mr. Teeter, Mr. Priester, Mr. Edwards.
- \*24. Differential Calculus I and II. Rules for differentiation. The various derivatives and their application to tangents, normals, evolutes, involutes, and maximum and minimum. Engineering examples will be given whenever possible. Prerequisite: Analytic Geometry I and II. Six credits; one meeting a week, first and second semesters. Mr. Edwards.
- \*25. Integral Calculus I and II. A continuation of Mathematics 24, taking up the standard forms of integration, special methods of integration..

- Important mechanical and electrical problems will be introduced and discussed in class. Prerequisite: Calculus I. Six credits; one meeting a week, first and second semesters. Mr. Edwards.
- \*151. Differential Equations I and II. For description see under Mathematics, page 31. Mr. Teeter, Mr. Edwards.
- \*50ex. Practical Physics I and II. Lectures and experimental demonstrations in general physics, designed to meet the needs of technical students and to be of value in understanding the machinery of everyday life. The subjects treated primarily are mechanics, heat and electricity; but geometrical optics, sound, and the general principles of radio-activity, X-rays, and vacuum tubes will also be taken up. This course should be taken in conjunction with Course 51ex. Six credits toward extension certificate; one meeting a week, first and second semesters. Mr. Buchta.
- \*51ex. Practical Physics: Laboratory. Experiments by the student illustrating the principles taught in Physics 50ex. This course should be taken with the preceding one as it is of great value in understanding the fundamental ideas and their applications. Three credits toward extension certificate; one meeting a week, each semester. Mr. Buchta.
- \*30ex. Elementary Applied Mechanics. A short practical course in the action of forces in engineering structures, for students who have limited mathematical training. It includes numerical calculations, simple graphical calculations, forces, simple mechanics, work, power, and energy. Prerequisites: Trigonometry 12 and Physics I. Three credits; one meeting a week, first semester. Mr. Brooke, Mr. Teeter, Mr. Edwards.
- \*33ex. Strength of Materials. An elementary course designed to follow the course in applied mechanics. The subject includes the properties of materials, stress and strain, elastic and ultimate strength, deformations, principles of moments, moments of inertia, simple stresses, shear, riveted joints, the general elementary theory of beams, columns, and shafts. Prerequisites: Applied Mechanics and Trigonometry 12. Three credits; one meeting a week, first or second semester. Mr. Brooke, Mr. Teeter, Mr. Edwards.
- \*126. Advanced Mechanics I. Statics, resolution of force, moments, theory of couples, conditions of equilibrium, free body method, catenary, and allied subjects. Prerequisite: Integral Calculus I and II. Three credits; one meeting a week; first semester. Mr. Wilcox.
- \*127. Advanced Mechanics II. Dynamics of particles and of rigid bodies, center of gravity, moment of inertia, kinematics of circular, harmonic, and curvilinear motion, work, energy, and power. Prerequisite: Advanced Mechanics I. Three credits; one meeting a week, second semester. Mr. Wilcox.
141. Testing of Materials. (Not offered in 1928-29.)

## MECHANICAL ENGINEERING

- \*1ex. Metallography and Heat Treatment of Iron and Steel. A beginning course including lectures, demonstrations, and laboratory work, pyrometry, thermal analysis, preparation of alloys, microscopic examination of metals and alloys and the preparation of photomicrographs, the theory of heat treating, and its relation to practice. Suitable for those engaged in the practical heat treatment of iron and steel and for those who are writing specifications, purchasing or selling iron or steel. Three credits; one meeting a week, first semester. Mr. Harder.
- \*2ex. Metallography and Heat Treatment of Alloy Steel. Course to follow 1ex. Lectures, demonstration, and laboratory work. Three credits; one meeting a week, second semester. Mr. Harder.
- 40ex. Steam Fitting. Covers steam using machines and equipment with particular emphasis on heating appliances and refrigerating machines. Three credits; one meeting a week, second semester. Mr. Martenis.
- \*42. Boiler Room Practice. Designed for the benefit of persons who have charge of boiler plants; of value to janitors in charge of schoolhouses and apartment houses, as well as factory boiler shops. It will also be of benefit to those who are expecting to obtain licenses as boiler inspectors. Three credits; one meeting a week, first semester. Mr. Martenis.
- \*43. Engine Room Practice. A continuation of the preceding course, taking up the subject of the steam engine and its accessories. This course is of value to those seeking a chief engineer's license. Three credits; one meeting a week, second semester. Mr. Martenis.
- \*153. Heating and Ventilating. A course covering present heating and ventilating practice for heating contractors and others desirous of obtaining a fundamental knowledge of the subject; the study of heat; methods employed for heating and ventilating buildings; piping systems and temperature regulation. Three credits; one meeting a week, first semester. Mr. Martenis.
150. Gasoline, Oil, and Diesel Engines. A practical course in the theory, construction, and testing of gasoline engines, automobile engines, semi-Diesel and Diesel engines. Fuels, combustion, lubrication, theoretical and practical engine cycles. The use of indicators, planimeters, brakes, electric dynamometers, pyrometers, and Orsat analyzers for determining horse power, mechanical and thermal losses in engine operations. The lectures will be followed by, and alternated with, actual tests of various types of engines by the students in the class. Six credits; one meeting a week, first and second semesters. Mr. Robertson.
82. Steam Engine and Power Plant Testing. Intended for stationary engineers who wish to become more efficient in their line of work. The course will consist of lessons supplemented by experimental demonstrations. Actual problems arising in power plant testing will be worked out in class, with explanations and instructions for their solution. The laws of mechanics, heat, power, work, and energy will be applied to engine and power plant testing. Three credits; one meeting a week, first semester. Mr. Shoop.

144. Elementary Thermodynamics. An elementary course required of all engineering students, relating to properties of steam, heat engines; the steam engine and boiler; the steam turbine, and the gas engine. The general problem of a modern power plant is considered for the benefit of those who do not devote further time to the subject. Three credits; one meeting a week, first semester. Mr. Edwards.
151. Thermodynamics. Advanced mechanical theory of heat as applied to steam, oil, and gas engines and gas producers, compressors, injectors, reheaters, and refrigeration apparatus. Prerequisite: Elementary Thermodynamics 144. Three credits; one meeting a week, second semester. Mr. Shoop.
124. Foundry Practice and Pattern Making I and II. A course dealing with practical problems in the production of castings. Floor planning and core room arrangement; moulding machinery and equipment; materials used; melting and pouring; methods of cleaning and reclaiming castings. Moulding in green and dry sand; sweep and loam work; core making and dryers; patterns and core boxes, how made and used. Shop sketching and blue print study. Six credits; one meeting a week, first and second semesters. Mr. Richards.
- 58ex. Shop Methods. The practical application of shop mathematics to metal cutting machines. Screw cutting, gear and milling cutter calculations. Lectures and demonstrations. Three credits; one meeting a week, first semester. Mr. Shipley.
- 171ex. Production Factors. Principles and practice involved in economical production. Standardization. Requirements for uniformity and interchangeability, jigs, fixtures, special equipment, gauges, and inspection. Labor wage payment plans and management. Three credits; one meeting a week, second semester. Mr. Shipley.
166. Refrigeration. Principles of refrigeration, various types of refrigerating machines, refrigerants, applications to ice making, cold storage, cooling of air, liquids, and solids. Three credits; one meeting a week, first semester. Mr. Nicholas.
137. Fuels and Their Combustion. This class will furnish information of a very practical nature to both the dealer in fuels and the combustion operator. The present fuel situation in its various phases will be discussed. The origin, composition, type, and classification of coal. Spontaneous combustion and storage of coal. Our coal resources and production. Petroleum and other primary fuels. The elementary chemistry of the combustion reactions. Combustion calculations. Combustion of coal on grates. The operation of hand-fired furnaces and mechanical stokers. Pulverized coal. Combustion of fuel oil. Furnace efficiency and distribution of heat losses. The carbonization of coal. Three credits; one meeting a week, first semester. Mr. Shoop.
- rex. Navigation and Practical Flying. Dead reckoning, corrections for wind, compass adjustments, sights on celestial bodies, map reading, aerology, weather maps, aircraft instruments. Stunts and maneuvers. Hangars and air ports. Prerequisite: Shop Mathematics I-II. Six

- credits; one meeting a week, first and second semesters. Mr. McKay.
- 2ex. Elementary Aeronautics. Types of airplanes, nomenclature, wind tunnels, physical properties of air, wing sections, stability, control surfaces, propellers, performance characteristics. Prerequisite: Shop Mathematics I-II. Six credits; one meeting a week, first and second semesters. Mr. Boehnlein.
- 3ex. Air Craft Engines. Types and development of airplane engines. Principles of ignition, carburetion, modern magnets and carburetors, radial air-cooled, "V" type water cooled motors. Laboratory tests of internal combustion engines of various types. Prerequisite: Shop Mathematics I-II. Six credits; one meeting a week, first and second semesters. Mr. Robertson.
- 4ex. Airplane Design. Design of propellers and wings, fusilage, undercarriage, controls, performance curves, various types of aircraft. Materials used in airplane construction, stress analysis, etc. Prerequisite: Shop Mathematics I-II. Six credits; one meeting a week, first and second semesters. Mr. Hazen.

## COLLATERAL COURSES

3. Economics of Engineering Costs. Primary basis of price; fixed charges and operating costs; depreciation and appreciation; obsolescence, inadequacy, uselessness; fundamental financial calculations; basic costs and "vestances"; unit cost determination; size of systems for best financial efficiency. Prerequisites: registration in calculus and physics. Three credits; one meeting a week, second semester. Mr. Teeter, Mr. Edwards.
- 51ex. English for Engineers I and II. A course in practical English, designed to meet the professional needs of engineering students. The material of this course will include business letters—about twelve types; reports; estimates; instructions, etc. Some attention will be given to oral English. Six credits; one meeting a week, first and second semesters. Mr. Ambler.
7. Law for Engineers A. Personal and ethical relations; rights and remedies; agreements and contractual relations; proposals, advertising and letting of contracts; competency of parties; mutuality of obligations; legality; specifications and construction; evidence; authority of agents; employment; workmen's compensation acts. Three credits; one meeting a week, first semester. Mr. Chapin, Mr. Jackman.
8. Law for Engineers D. Property, real and personal; sales; carriers and storage; land laws; surveys and boundaries; rights of way and water rights; negligence and damages; engineer's legal relations. Three credits; one meeting a week, second semester. Mr. Chapin, Mr. Jackman.



## Extension Certificates Granted 1927-28

### CERTIFICATE IN ACCOUNTING

Raymond A. Albers	Henry David Rockowitz
William Edward F. Erickson	Hyman Rockowitz
Grace C. Fillmore	Elsie Augusta Schneider
Colletta Mary Janda	Martha Louise Schneider
Ella M. Lee	Roger G. Soderberg
Leslie A. Ludeking	George Edward Troedson
Theodore W. Lyden	Donald Merton Wakefield
Leslie Theodore Madden	Paul Carl Wilson
George A. Nelson	Joseph George Zilliox

### CERTIFICATE IN GENERAL BUSINESS

Jay Carroll	Minnie L. Kuehne
Wendell C. Cheney	Edith Luella McKenzie
Lawrence E. Coupe	Adelbert Raymond Tymeson
John C. Effinger	Paul Carl Wilson

### CERTIFICATE IN FINANCE

Minnie L. Kuehne

### CERTIFICATE IN CIVIL ENGINEERING

John Fred Fredin, Jr.	Niels Peter Sorensen
John F. Robohm, Jr.	Matt George Tometz

### CERTIFICATE IN ELECTRICAL ENGINEERING

Marven Theodore Emme	Landrock Peter Larsen
	George Taus

### CERTIFICATE IN MECHANICAL ENGINEERING

Charles B. Diers	John Ne's Myhrman
Elov Carl Kempe	John M. Peck
	Henry James Sullivan

## Summary of Student Semester Registrations, 1927-28

Minneapolis collegiate .....	3,516	
Minneapolis business .....	1,683	
Minneapolis engineering .....	934	
St. Paul collegiate .....	1,173	
St. Paul business .....	1,206	
St. Paul engineering .....	219	
Duluth collegiate .....	878	
Duluth business .....	235	
Duluth engineering .....	201	
Chisholm collegiate .....	117	
Eveleth collegiate .....	106	
Hibbing collegiate .....	113	
Red Wing collegiate .....	30	
Rochester collegiate .....	40	
South St. Paul collegiate.....	13	
Superior, Wisconsin, collegiate.....	51	
Two Harbors collegiate.....	20	
Virginia collegiate .....	240	
Total number of student semester registrations.....		10,775
Total number of individuals taking work 1927-28.....		6,125
Total collegiate registrations .....	6,297	
Total business registrations .....	3,124	
Total engineering registrations .....	1,354	

## What Extension Does

The University of Minnesota, through the General Extension Division, makes its facilities of faculties, libraries, and laboratories available to the people of the state as a part of its educational service.

### FORMAL INSTRUCTION

Extension classes, conducted in late afternoon and evening hours, in Minneapolis, St. Paul, Duluth, and several other centers.

The subjects taught include: Science, Literature and the Arts courses, Education courses, Business courses, Engineering or Industrial courses.

Correspondence instruction, or home study courses, in: secondary school or preparatory subjects, Subjects of collegiate or university grade, Vocational or specialized subjects.

Short courses of an intensive nature, covering brief periods of time, in subjects under the general heads of: Medicine, Dentistry, Embalming, Boy and Girl Scout leadership, Retail merchandising, Electric meter testing, Citizenship.

### INFORMAL INSTRUCTION

University extension lectures, delivered in Minnesota communities by members of the university faculty on literary, social, economic, and political subjects.

The university lyceum, a system of popular lectures, artist recitals, concerts, and dramatic productions, organized by the University from professional sources and furnished to Minnesota communities.

The university radio, through which programs of lectures, music, debates and useful information, as well as lessons supplementary to correspondence courses are broadcast.

### SERVICE FUNCTIONS

The Municipal Reference Bureau, makes researches on problems of municipal government, frames model ordinances, collects statistics, issues reports on matters of current interest, advises on city charters, and secures consultation and advice of experts and specialists.

The Bureau of Visual Instruction lends to schools, clubs, churches, and other community organizations, educational films, slides, and charts.

A Drama Service lends to dramatic societies and other organizations copies of plays suitable for amateur presentation, and gives advice on staging and production.

A Community Welfare Service fosters and stimulates the organization of community clubs and other societies for the social and business improvement of a town. It also gives advice and assistance concerning speakers and programs.

Supervision and administration of a state-wide music contest.

Publication of bulletins and monographs on extension activities.

Co-operation with other agencies, such as: National University Extension Association, League of Minnesota Municipalities, Parent-teachers associations, taxpayers associations, League of Women Voters, State Conference of Charities and Corrections, supplying information about adult education.

# *The Bulletin* *of the University of* **Minnesota**

*Correspondence Courses*  
*Announcement for the Year*  
**1929 - 1930**



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## CORRESPONDENCE COURSES

### FACULTY

- Lotus Delta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Richard R. Price, M.A., Ed.D., Director of University Extension  
Algernon H. Speer, B.A., Head of Correspondence Study Department
- John E. Anderson, Ph.D., Professor and Director, Institute of Child Welfare  
Carlos V. Arjona, Ph.D., Associate Professor of Romance Languages  
William O. Beal, Ph.D., Assistant Professor of Astronomy and Assistant Astronomer  
Roy G. Blakey, Ph.D., Professor of Economics  
Gisle C. Bothne, M.A., Professor of Scandinavian Languages and Literatures  
Ruth E. Boynton, M.S., M.D., Assistant Professor of Preventive Medicine and Public Health and Director, Division of Child Hygiene, State Board of Health  
Oscar C. Burkhard, Ph.D., Professor of German  
Edward G. Cheyney, B.A., Professor of Forestry  
Herbert E. Clefton, Ph.D., Assistant Professor of Romance Languages  
Robert V. Cram, Ph.D., Assistant Professor of Latin  
James Davies, Ph.D., Assistant Professor of German  
Harold S. Diehl, M.A., M.D., Director of Students' Health Service and Associate Professor and Chief of the Department of Preventive Medicine and Public Health  
Oliver C. Edwards, B.S., M.E., Assistant Professor of Mechanical Engineering, General Extension Division  
Marion L. Faegre, B.A., Extension Worker and Assistant Professor, Institute of Child Welfare  
Oliver P. Field, M.A., S.J.D., Associate Professor of Political Science  
Jules T. Frein, B.A., Assistant Professor of Romance Languages  
Robert W. French, B.S. (C.E.), Associate Professor of Drawing and Descriptive Geometry  
Everett C. Hartley, B.A., M.D., Director, Division of Child Hygiene, State Board of Health  
L. Burton Hessler, Ph.D., Assistant Professor of English  
Clarence P. Hotson, Ph.D., Assistant Professor of English, General Extension Division  
Samuel Kroesch, Ph.D., Professor of German  
Gustave A. Lundquist, Ph.D., Assistant Professor of Rural Sociology  
George F. Lussky, Ph.D., Assistant Professor of German  
Esther McGinnis, Ph.D., Associate Professor, Director of Extension in the Institute of Child Welfare  
John V. Martenis, M.E., Associate Professor of Machine Design  
Lennox Mills, Ph.D., Assistant Professor of Political Science  
Walter R. Myers, Ph.D., Assistant Professor of Economics  
Charles W. Nichols, Ph.D., Assistant Professor of English  
Stanley H. Perry, B.A., Assistant Professor of History, General Extension Division

- Anna H. Phelan, Ph.D., Assistant Professor of English  
 Joseph B. Pike, M.A., Professor of Latin  
 Harold S. Quigley, Ph.D., Professor of Political Science  
 Albert W. Rankin, B.A., Professor of Education, Retired.  
 Allan F. Saunders, Ph.D., Assistant Professor of Political Science  
 Charles A. Savage, Ph.D., Professor of Greek  
 William H. Stead, Ph.D., Assistant Professor of Economics  
 J. Warren Stehman, Ph.D., Professor of Economics  
 Thomas E. Steward, B.A., Assistant Professor of Journalism  
 Herbert Sorenson, Ph.D., Assistant Professor of Educational Psychology  
 Andrew A. Stomberg, M.S., Professor of Scandinavian Languages and  
 Literatures  
 Thomas A. H. Teeter, B.S. (C.E.), Associate Professor of Engineering,  
 General Extension Division  
 George A. Thiel, Ph.D., Associate Professor of Geology  
 Roland S. Vaile, M.A., Professor of Economics  
 Wilson D. Wallis, Ph.D., Professor of Anthropology  
 Wendell White, Ph.D., Assistant Professor of Psychology, General Ex-  
 tension Division  
 Jean H. Alexander, M.A., Instructor in History and Philosophy of  
 Education  
 Arend E. Boer, B.S., Instructor in Accounting  
 Jessie Caplin, M.S., Instructor in Textiles  
 John J. Creamer, B.A., LL.B., Instructor in English  
 Frances K. del Plaine, M.A., Instructor in English  
 Robert W. Desmond, B.A., Instructor in Journalism  
 Monica Keating Doyle, M.A., Instructor in Sociology  
 Anne L. Fenlason, M.A., Instructor in Sociology  
 Mary S. Gold, M.A., Instructor, University High School  
 Adah G. Grandy, B.L., Instructor in English  
 Richard A. Graves, M.A., Instructor in Economics  
 Arthur B. Gunnarson, M.B.A., Instructor in Investments  
 Leah Miller Hanley, B.S., Instructor in Art  
 Mabel E. Holmberg, B.S., Instructor in English  
 Jerome Jackman, B.A., Instructor in Business Law, General Extension  
 Division  
 Alta J. Jones, M.A., Instructor in English, General Extension Division  
 Frances R. Kelley, M.A., Instructor in Home Management  
 Fred L. Kildow, B.A., Instructor in Journalism  
 Richard Kozelka, M.A., Instructor in Economics  
 Bruce R. McCoy, B.A., Instructor in Journalism  
 Helen P. Mudgett, M.A., Instructor in History  
 Jay L. O'Hara, Ph.D., Instructor in Office Management  
 Alfred V. Overn, M.S., Instructor in Education  
 Pearl C. Salsberry, B.A., Lecturer in Sociology  
 Joseph R. Starr, Ph.D., Instructor in Political Science  
 Louis A. Tohill, Ph.D., Instructor, University High School  
 Lehman Wendell, B.S., D.D.S., Instructor in Esperanto  
 Edmund G. Williamson, B.A., Instructor in Psychology  
 Nina L. Youngs, B.A., Instructor in Business  
 Ralph W. Erickson, B.A., Assistant in Psychology  
 Mary Malcolm, B.S., Assistant in Music



## GENERAL INFORMATION

### CORRESPONDENCE STUDY

The last few years have demonstrated the effectiveness of university teaching by correspondence. The foremost American universities have recognized this opportunity for specific service. In thus extending its functions, the University 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 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 at the University Summer Session with correspondence study under the General Extension Division.

### WHO MAY REGISTER

Correspondence 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. Specific items of preparation are not insisted upon so long as a general level is indicated. Students of this character are welcomed, and are given the same careful instruction and criticism as those who are candidates for a degree.

### ADVANTAGES

Correspondence study accommodates itself to a person's spare time, enabling him to make valuable use of short periods which would otherwise be wasted; it permits him to carry on work in a field of study in which he has a special interest, to prepare for special occupations, to broaden his intellectual outlook, or to make up defects in his education.

The student recites on every part of every lesson and receives the individual attention of the teacher in the correction of the papers he submits. Since a student is not hurried in his work, but may within reasonable limits take as much time as he needs for the preparation of a lesson, he can master the material thoroly.

### 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 teachers 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 non-resident students.

Each lesson contains questions to test the student's methods of work as well as his understanding of the ground covered. After preparing for recitation, the student writes his answers to the questions and returns them, together with a statement of any difficulties which may have arisen during his study.

Each recitation report is returned to the student with such corrections, explanations, and suggestions as may be needed. It is expected that these will be carefully gone over. Lists of books, assignments for reading, and all necessary assistance will be furnished throughout the course, so that the student at no time will be left without adequate aid and guidance. Questions on the subject in hand are at all times encouraged.

#### THE UNIT COURSE

The unit course is divided, where practicable, into twenty-seven lessons, representing a five-credit course for one quarter in residence. Such a course represents an amount of work equal to that done in residence at the University in a study of five full recitation hours per week for one quarter. It is assumed that this work may be done by the average student in twenty-seven weeks with a minimum leisure for study of one hour per day, six days in the week. Variations from the unit course are indicated by the number of credits, or by the number of lessons when university credit is not allowed. Two lessons in correspondence approximately cover the ground in quantity of a week's work in residence.

Preparatory courses are arranged so that each lesson covers approximately the equivalent of a week's work in high school.

#### SELECTION OF COURSES

In selecting courses for university credit, the student should conform to the prescribed course of study of each college. It is advisable for such students to secure a copy of the bulletin of the college which they expect to enter, in order to find out what subjects are prescribed. The bulletin of any of the colleges of the University may be secured by addressing the registrar, University of Minnesota, Minneapolis.

#### PREPARATORY COURSES

Admission to the schools and colleges of the University which accept students directly from the high school is either by certificate or examination.

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 as 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 had of 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 subjects, are required for entrance in any case; the particular requirements of the several colleges vary.

Then how can a student who is not a high school graduate enter the University? There are just three ways.

1. Obtain admission by examination.

Applicants for admission to the University who are high school graduates, or who are at least nineteen years of age and are unable to meet the requirements for entrance by certificate will 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.

Applicants failing to pass tests (b) or (c) may apply for 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.

2. Obtain credits by passing the correspondence courses offered by the University.

3. Obtain credits by passing the Minnesota High School Board examinations, or the examinations of the College Entrance Examination Board.

The Correspondence Study Department of the University can help a student to obtain entrance credits in four different ways:

1. 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.

2. If he lacks a few credits of high school graduation he often can arrange with the high school in which he did most of his work to grant him a diploma after he has obtained the credits by correspondence from the University.

3. He can take the State Board examinations, in those subjects for which he is prepared by previous schooling, and obtain the remaining credits by correspondence.

4. He can do all of his preparatory work by correspondence. However, this is a long and difficult task and is not recommended except to persons of great patience and determination. Still, it can be done.

Whether a state teachers' college or a local high school will accept the entrance or "high school" 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. Many of them are known to accept such credits and none has been reported as refusing to do so, but this is a matter over which the University has no jurisdiction. Therefore, students who expect to make use of credits in this way should first make sure of the attitude of the school in which it is sought to apply them. No registration for entrance credit will be accepted from a student who is at the same time enrolled

in a secondary school, except upon written permission from that school. The University does not grant a high school diploma for work done by correspondence.

## LIST OF PREPARATORY COURSES

Below is a list of the courses offered by correspondence which may be taken for credit toward entrance. The student who successfully completes any of this work is not required to take entrance examination in the subjects covered. 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 credit may not be repeated for college credit.

## Group A: English

English Literature A, B, C, and D

English Composition A, B, C, and D

## Group B: Languages

German A, B, C, and D

See courses marked with an asterisk under Greek, Latin, Romance Languages (French and Spanish) and Scandinavian (Norwegian and Swedish).

## Group C: History and Social Science

American History A and B

World History A and B

Social Science A

Social Science B

## Group D: Mathematics

Algebra A and B

Plane Geometry A and B

Solid Geometry

Higher Algebra, Part I

## Group E: Natural Sciences

Elementary Physics A and B

(No credit; see note on page 45)

## Group F:

Mechanical Drawing I and II

(See Engineering, Courses 3 and 4, page 26)

Elementary Bookkeeping

(See Business, Course 7, page 20)

## BOOKS AND OUTFIT

All necessary textbooks, drawing outfits, and apparatus are extra and *must be procured by the student*. Money should *not be sent* to the University for the purchase of texts and other material. When ordering textbooks, the student should give the exact title, the author, and the publisher.

Some reference books may be borrowed from the university library. Such loans are necessarily limited to books which are not needed for use in university classes, or for other use on the University campus. This privilege does not apply to the necessary 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. Requests for such reference books should be addressed to the librarian, University of Minnesota, Minneapolis, and the student should state explicitly what books are desired, with the author's name, title of the book, and the volume number, naming the course in which they are to be used and giving full instructions for mailing. Blanks are supplied for this purpose.

The State Department of Education operates a lending library service, available to residents of Minnesota, through which students may obtain some of the necessary books. Application should be made to the Library Division, State Department of Education, State Historical Building, St. Paul.

Students should first of all secure the assistance of local libraries, public, school, or other. Librarians are always willing to co-operate, and will often secure a needed reference book, provided it has any prospect of further circulation. No list of textbooks is published by the department.

#### LOAN LIBRARY FACILITIES

The General Extension Division operates a loan library service in connection with some courses. This is designed to furnish reference books when all other sources have been exhausted. A small fee is charged for the service. Details of administration will be furnished with the first lessons of the courses for which it is available.

#### PROCEDURE

The student who wishes to undertake correspondence study should first select such course or courses as he may desire to take and send for an application blank if he has not already obtained one. All applications must be made on the blank furnished by the department. He should fill out the blank with all the information called for and return it with the required fee to the Correspondence Study Department, General Extension Division, University of Minnesota, Minneapolis. Ink should be used in filling 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.* They should cover the exact amount of the fee, no more and no less.

## SPECIAL CLUBS AND GROUP SERVICES

The Correspondence Study Department offers special services to less organized groups which do not necessarily report back in a class way to the department. Some of these services follow.

### CLUB STUDY PROGRAMS

For the benefit of study groups of all types; i.e., women's clubs, there are offered club study programs arranged for twelve meetings for a winter's use. These programs are evolved mainly by faculty members and are comprehensive and scholarly. The generous amount of material can be expanded.

Famous Women, Minnesota History, Awakening China, Prehistoric America, Modern Plays, India, Literature of the Middle West, and the Romance of Chemistry are the titles of some of these programs. Others will be offered later. Rich bibliographies are included and helps toward topical and paper discussions are given. No correspondence study service is involved. The price is nominal. Ask for further information.

### GROUP STUDY BY CORRESPONDENCE

Group study by correspondence involves the linking up of a club with the correspondence courses direct. Individual members of the club are not granted university credit, but a correspondent acts for the group and the same cultural results may be obtained as if the individual were taking the course alone. The subjects available are all the correspondence courses as given in this bulletin. The departmental service observes the same rules of time as for an individual.

This university affiliation guarantees the leadership needed for very successful club study, and the closely knit and serious minded groups may obtain satisfactory results. Write for pamphlet of information.

### RADIO LESSONS

Courses in Spanish, French, and German were offered over WLB, the university radio station, during the winter of 1928-29.

These courses involved twenty-seven lessons each, in which the groups or individuals in their respective meeting places listened in upon expert instruction by university professors, at the same time having in their hands lesson material which is furnished at a very nominal cost.

Watch for the radio plans of 1929-30.

### READING COURSES

The General Extension Division, during the year 1928-29, organized for action many associations of the state, the libraries, the State Parent-Teacher Association, and such other groups.

The nucleus of the plan is to stimulate reading in the organized courses already available, such as the American Library Association "Reading with a Purpose" Series, the United States Bureau of Education Reading Courses, together with university courses so that there may be a definite aim in the person's reading. Recognition is given by means of a certificate coming directly from the University to anyone who certifies to finishing a full course.

A bulletin on reading courses will be furnished gratis, there being no charge for any service except the certificate service.

## SUGGESTIONS OF NEW COURSES

### INSURANCE

Courses in Life Insurance, Fire and Marine Insurance, and Casualty Insurance are cataloged for the first time. These courses are all credit courses, and carried by the regular professor in this subject.

### JOURNALISM

The following new courses in Journalism are added: News Gathering for Clubs and Other Organizations, Rural Community Reporting, and Supervision of School Publications. These are credit courses.

### PREVENTIVE MEDICINE

There is being added to those courses formerly given in this line the following: Preventive Medicine, and Health Care of the Family. These are credit courses.

### POLITICAL SCIENCE

New courses are now cataloged in World Politics and Comparative European Government.

### BUSINESS SUBJECTS

*Special sequence in Personnel Management.*—In offering courses in Personnel Administration the department feels that it will open this field to many who are not now able to secure any training at all. This will apply as much to employers themselves, as to those who aspire to become employment directors for business enterprises.

#### I

Principle of Economics I  
Principles of Economics II  
Labor Problems and Trade Unionism

#### II

General Psychology I  
Personnel Administration  
Advanced Personnel Administration  
Personnel Psychology  
Office Organization and Management

The first sequence covers the necessary foundations of economic theory which will enable the employer or director to work in accordance with accepted economic procedure.

The second sequence contains the courses in Psychology and Personnel Management in their preferred order, showing their particular application to office management.

Students may register for any of the above courses separately. All courses mentioned above are credit courses.

## REGULATIONS

### ADMISSION

All persons who seem qualified to pursue successfully the courses offered will be admitted to registration without formal examination. The student is required to fill out an application blank giving all the information asked for in order that his fitness to pursue the course selected may be determined. It is desired that the student state fully the purpose he has in view in taking the work and give in detail the educational advantages, training, or experience he may have had. The department endeavors to meet the needs of the individual student by advice and suggestions, as well as by formal instructions, but whenever it finds that the courses selected are not for the best interests of the student, it reserves the right to reject the application or to advise change. It also reserves the right to advise discontinuance or change after a course has been started, if the student shows entire unfitness for the work. Whenever a registration is discontinued in this way or rejected the fee will be returned.

### AMOUNT OF WORK CARRIED

Not more than two courses may be carried through correspondence at one time.

The maximum number of lessons that will normally be accepted from a student is four per week, regardless of whether one or two courses are being carried. Any variation of this regulation must have the approval of the department.

Correspondence courses are included in the amount of work permitted for students in extension classes. Accordingly students pursuing both kinds of extension study should have their total amount approved by the Student's Work Committee of the General Extension Division.

### TIME

A student may begin a correspondence course at any time, and will be required to 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 that all courses will be given. While instructors are on vacation their work may be carried by a substitute, or it may be temporarily discontinued. In the latter case an extension of time for the completion of a course affected may be allowed.

As a rule the student should endeavor to send in at least one recitation 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 completed. This practice will cause delays in their return; and in addition,



the student should endeavor to secure the instructor's corrections and criticisms before proceeding too far with advanced lessons.

#### CARE IN PREPARING LESSON REPORTS

All students will be expected to play fair with themselves and with the Correspondence Study Department. Since all lessons are prepared on the student's own responsibility, apart from the university classes and consequent supervision, any deviation from a strict honor basis must necessarily be visited with immediate and heavy penalty, even to cancellation of the course.

#### REINSTATEMENT

Any student whose registration has expired, or 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 reinstated. Such reinstatement holds for one year. No reinstatement will be granted after four years from the date of registration.

#### TRANSFER OF REGISTRATION

Any student may have the privilege of transferring his registration from one correspondence subject to another by the payment of a fee of one dollar, but no transfer will be allowed after four 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.

#### FEES

All fees are payable at the time the student files his application for registration. No reduction of fee is made for a combination of courses carried simultaneously. 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 (\$2) 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 will be made for each lesson.

#### CREDIT

Students who undertake correspondence study work for university credit must state this fact in advance and comply with all requirements of the University, including the prerequisites for each course. University

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. Registrations for credit will not be accepted unless evidence is given that university entrance requirements can be met. These requirements are usually comprised in a four-year high school course.

Those seeking a university degree must conform to all the requirements exacted by the college or school in which such 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. The work of the earlier part of the course is more likely to be available for correspondence study. The work of the senior year, or the major portion of it, must be done in residence.

Credit is granted by the College of Engineering and Architecture and by the School of Chemistry only on the satisfactory completion of a comprehensive examination given by the department concerned. Students desiring this credit should make advance arrangements for its acceptance through the dean of the college concerned.

Students of teachers' colleges who undertake courses for university credit with the purpose of having the credit transferred to the teachers' college in which they are working for a diploma should make certain by consultation with the proper authorities at the teachers' college that the arrangement to do this is satisfactory and that the course selected fits into their program.

Entrance credit is allowed for courses of high school grade. See Preparatory Courses, pages 6-8.

No credits may be earned by correspondence study to apply on the Master's degree, or any other graduate degree.

#### TRANSFER OF CREDITS

Credits obtained through work with this department will be certified to other schools or colleges upon request, but it must be understood that their acceptance by another institution depends wholly upon the regulations of that institution. Students who expect to apply our credits elsewhere should first make sure of the rules of the other school or college.

A "credit" does not mean the same thing in different institutions respectively and hence a transfer of credits usually involves the calculation of credit equivalents. A University of Minnesota credit now means one fifty-minute classroom period per week for a "quarter," or twelve weeks. Formerly it meant the same quantity of classroom work per week for a "semester" of seventeen weeks. Three "quarter credits" are equivalent to two "semester" credits.

Most colleges reckon credits by one or the other of the foregoing methods, but other methods are sometimes used.

It must be understood that the classroom periods indicated above do not include the time required for preparation, which is ordinarily two hours of outside study for each classroom hour.

## EXAMINATIONS

All students, on completing any course, will be given an examination either at the University, at the several city extension offices, or by arrangement, in the student's home town, under the supervision of an accredited representative of the University. This 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. Failure in the examination means failure in the course, regardless of previous grades.

*Deferred examinations.*—Examinations should be taken immediately following the completion of the last lesson of the course. They may, however, be deferred at the desire of the student. If taken any time before the expiration of the course registration there is no extra charge; after this expiration there will be the regular reinstatement fee of \$1.

## 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 (75-81%) 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 (81-87) indicates the quality of work acceptable for graduation; A (93-100) and B (87-93) are given to work of especial merit.

Honor points are assigned to each grade, as follows: D, none; C, 1 point; B, 2; A, 3. On the basis that grade C is necessary for graduation, a student must earn at least as many honor points as credits. The bachelor of arts degree, for instance, requires 180 credits and 180 honor points. The accumulation of honor points enables the student to reduce the number of credits required, on the following scale; for each *five* honor points in excess of one per credit, the required number of credits is reduced by one. This applies to work done by correspondence.

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 final grade, however, may not be higher than C; and unless the examination be taken within three months the grade becomes a failure. A course receiving a final grade of F must be repeated before any credit may be given.

## STATE TEACHERS' CERTIFICATES

The Department of Public Instruction issues elementary school certificates upon examination or upon the presentation of a diploma earned in a two-year course at a state teachers' college. Correspondence credits are not directly applicable for these certificates but usually may be applied toward a diploma, if arrangements have been made in advance with the teachers' college.

Professional certificates, entitling the holder to teach in high schools, are issued upon examination or upon the presentation of an academic degree from an accredited college, together with credentials showing fifteen semester credits or twenty-two and a half quarter credits in certain desig-

nated educational subjects, earned in a recognized institution. Educational credits received from this department will be accepted directly toward such a certificate when presented by the holder of an academic degree.

In either case correspondence courses may be used as an efficient means of preparing for the state examinations.

#### RESIDENT STUDENTS

Registration for correspondence 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.

Persons pursuing correspondence courses for credit must discontinue them when they enter upon resident study. Arrangements may be made to hold the courses over until the student is again free to pursue them.

No registration for a correspondence 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.

#### OTHER EXTENSION ACTIVITIES

The General Extension Service of the University of Minnesota includes five forms of activity:

- a. Evening classes in Minneapolis, St. Paul, Duluth, and other cities.
  1. Credit courses in the College of Science, Literature, and the Arts; in the College of Education; in the School of Business Administration; and in the School of Mines and Metallurgy.
  2. Non-credit courses in special business subjects: Retail Advertising, Salesmanship, Business English, Insurance.
  3. Practical courses in engineering, and in industrial subjects.
- b. Correspondence Courses.
- c. Lyceum and Lecture Service.
  1. Lectures, concerts, and entertainments.
  2. Film Service. Loan collections supplied.
  3. Drama Service, through which dramatic clubs and school societies are given advice regarding the production of amateur theatricals. Loan plays are available.
  4. Radio Service. Special lectures and entertainments are often given over the radio; also class work in modern languages, especially, is given in co-operation with the Correspondence Study Department.
- d. Short Courses and Institutes.
 

Merchants' Short Courses, Embalming School, Funeral Directors' Institute, Firemen's Institute, etc.
- e. Municipal Reference Bureau Service.
 

This bureau assists municipalities in matters of taxes, fire prevention, and other municipal problems.

Agricultural Extension Service, including lectures, demonstrations, institutes, and short courses, is furnished under the direction of the Extension Department of the College of Agriculture, Forestry, and Home Economics. For this latter service, address the Farm School, University of Minnesota, St. Paul, Minnesota.

## DESCRIPTION OF COURSES\*

### ANTHROPOLOGY

41. Introduction to Anthropology. Origin and development of mankind and the races; racial distribution and immigration; the bearing of anthropology on present-day thought and problems.  
Twenty-seven lessons (five credits). Prof. Wallis. \$17.00.

### ART EDUCATION

3. Interior Decorating. The course aims to meet the needs of homemakers and teachers; to show how to make the home comfortable and artistic. Instruction will consist of written lectures and textbook study. Blue prints and samples of fabrics will be sent with course. Students will draw series of simple plates to illustrate principles. Subjects discussed include: color, walls, floors and their coverings, period and modern furniture, fireplaces, pictures, and accessories.  
Equivalent to Art Education 3, College of Education.  
Sixteen lessons (three credits). Mrs. Hanley. \$10.00.

### ASTRONOMY

1. 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 which all intelligent people should know, rather than the technical details of the work of a professional astronomer. Altho not necessary the student will find that a small telescope or even an opera glass, will add greatly to the interest in the subject.  
Equivalent to Astronomy 11 offered in residence.  
Twenty-seven lessons (five credits). Asst. Prof. Beal. \$17.00.

### BUSINESS

(For courses in other Business Subjects, see page 20, Economics.)

- 1c. Business Correspondence. Mastery of materials, letters in general, letters adjusting complaints, reminder letters, recommendation letters, application letters, credit and collection letters, general sales letters, form letters, follow-up letters. The ability to use correct English is prerequisite.  
Twenty-four lessons (extension credit only). Mr. Creamer. \$15.00.
59. Life Insurance. This course deals with the nature, uses, and kinds of life insurance and with the fundamental principles involved in the measurement and underwriting of life risks.

Among the topics covered are the following: Uses of Life Insurance; Types of Policy Contracts; Mortality Tables; Calculation of

\* The letter c appearing after the course number indicates that the particular course is not given in residence.

Premiums and Reserves; Sources and Disposition of Surplus; Surrender and Loan Values; Disability Provisions; Fraternal, Industrial, and Group Insurance; Government Control of Insurance; Legal Interpretation of the Insurance Contract. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). Mr. Graves. \$10.00.

60. Fire and Marine Insurance. The course includes a treatment of the 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. Several of the more important topics are: The Standard Fire Policy; Co-insurance; Policy Endorsements; Use and Occupancy, Profits and Rents Insurance; Fire Insurance Rates; State Supervision and Regulation; Marine Policies, Losses, and Rates; Windstorm, Hail, and Tornado Insurance. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). Mr. Graves. \$10.00.

61. Casualty Insurance. The course deals with the various types of coverage which have been developed in this field and includes the analysis of policy provisions and treatment of the important factors involved in the making of rates for each of these types of insurance. Among the important casualty lines discussed are: Employers' Liability Insurance; Workmen's Compensation Insurance; Automobile Liability and Property Damage Insurance; Automobile Collision Insurance; Accident Insurance; Sickness Insurance; Burglary and Theft Insurance; Credit Insurance; Plate Glass Insurance. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). Mr. Graves. \$10.00.

67. Economics of Retailing. 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. The following general topics covered: store organization, location and equipment; store purchase and control; merchandise classification and layout; store policies as to price, credits, returns and allowances, and delivery; administrative policies as to personnel, and in relation to general business commodities. (A practical course for the active merchant.) Prerequisite for credit: ten credits in economics.

Sixteen lessons (three credits). Prof. Vaile. \$10.00.

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. Prerequisite for credit: Principles of Economics I and II.

Sixteen lessons (three credits). Mr. O'Hara. \$10.00.

88. Retail Store Advertising. A course discussing the economics of advertising from the point of view of the retail store manager. Advertising and retail sales promotion. Advertising media and technique. Prerequisite for credit: ten credits in economics.

Sixteen lessons (three credits). Prof. Vaile. \$10.00.

146. Investments. Bonds, mortgages, stocks, and other forms of property in which funds may be invested, with emphasis on the needs of the conservative investor. The criteria of a good investment are carefully considered and tested by applying them to specific issues of governments, corporations, and individuals, including railroads, industrial, timber, and mining securities, and real estate loans. Prerequisite for credit: Mechanism of Exchange and Corporation Finance. (Recommended to practical business men, to whom it is open without prerequisite.)

Sixteen lessons (three credits). Mr. Gunnarson. \$10.00.

155. Corporation Finance. A study of the organization and financial management of corporations, with reference to corporate securities for purposes of promotion and reorganization and of facilities for marketing them. Prerequisites for credit: Principles of Economics 6 and 7, and 5 credits in Mechanism of Exchange.

Sixteen lessons (three credits). Prof. Stelman. \$10.00.

167. Personnel Administration. A general survey course covering the organization of personnel work within an organization, and discussing briefly the types of problems confronting the typical personnel department. The major topics considered include the organization of the personnel department, the selection and placement of workers, education and training, promotion and transfer, health and safety, wages and other incentives, joint relations between employers and employees, employee service, and personnel research. Prerequisite for credit: Labor Problems and Trade Unionism, preceded by Principles of Economics I and II.

Sixteen lessons (three credits). Asst. Prof. Stead. \$10.00.

168. Advanced Personnel Administration. A course dealing with the instruments and techniques used in carrying on personnel work. The various instruments and procedures used are analyzed and evaluated in connection with such matters as the labor audit, job analysis, selection procedure, labor turnover analysis, rating scales and promotion charts, salary control, training procedure, personal adjustments, and personnel research methods. Prerequisite for credit: Personnel Administration.

Sixteen lessons (three credits). Asst. Prof. Stead. \$10.00.

#### CHILD WELFARE

Offered in co-operation with the Institute of Child Welfare.

- 1c. Child Care and Training. Physical growth, care, and diet of young children. Mental development, personality, and behavior. The management of young children with reference to the establishment of correct habits of behavior. Play, toys, games, stories, and music. Intended primarily for the parents of young children. Offered to residents of Minnesota without fee.

Sixteen lessons (no credit). Assoc. Prof. McGinnis, Asst. Prof. Faegre.

40. **Child Development and 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.

Sixteen lessons (three credits). Assoc. Prof. McGinnis, Asst. Prof. Faegre. \$10.00.

50. **Home Education Methods for Young Children.** How the mother may direct the activities of the young child in the home. 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. Open to those who have completed Course 40.

Sixteen lessons (three credits). Assoc. Prof. McGinnis, Asst. Prof. Faegre.

Registrations accepted after October 15, 1929.

#### ECONOMICS

- 1c. **Elementary Bookkeeping.** The aim of this course is to present the groundwork of bookkeeping for the student who does not feel able to complete an extensive course in accounting. The following topics will be covered: the function of accounting, theory of debit and credit, journalizing and posting, account analysis, the use of special types of journals and ledgers, trial balance, adjusting and closing the accounts, presentation of the period's results, balance sheet, and profit and loss statements. Sufficient practice material will be given to enable the student to grasp the fundamentals.

Twelve lessons (one-fourth entrance unit). Mr. Boer. \$7.50.

- 3.\* **Mechanism of Exchange.** An introduction to the study of modern financial institutions; consideration of the nature and functions of money, its types and methods of control; 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, and agricultural credit institutions.

Twenty-seven lessons (five credits). Asst. Prof. Myers. \$17.00.

- 4c.\* **Banking Practice.** The subject-matter of this course aims to present a thoro understanding of the operations of a modern commercial bank and includes many managerial problems. Some attention will be given to the legal problems arising in dealings between banks and their customers. Beginning with a description of commercial banking, of savings banks, and trust companies, the course will be developed under the following topics: how to organize a commercial bank; shareholders, directors, and officers, their duties, powers, and liabilities; deposits, depositors, and the receiving teller; the paying teller and checks; the bank reserve; national bank notes; clearing houses; collections and

\* Credit may not be obtained for both Courses 3 and 4c.



domestic exchange; foreign exchange; loans and discounts, credit departments and how they judge credit; collateral loans; statements of conditions; the object of bank accounting; supervision and examination; central banks of England, France, and Germany, and the federal reserve system of the United States. Prerequisite for credit: Principles of Economics I and II.

Twenty-four lessons (four and one-half credits). Asst. Prof. Myers. \$15.00.

6. Principles of Economics, Part I. This course, with Part II, is designed to give a general understanding of our present industrial order. Special attention is given to descriptive accounts of economic institutions and to a consideration of basic principles underlying their operation.

Part I of the course presents certain fundamental concepts followed by a study of division of labor, of large scale production, and of the corporation as a type of enterprise. The principles governing value follow. This part closes with a discussion of money, banking, prices, crises, and international trade.

Twenty-seven lessons (five credits). Mr. Kozelka. \$17.00.

7. Principles of Economics, Part II. A continuation of the study of value to discover what measures the reward received by the respective factors of production in wages, interest, rent, and profits. Then follows special problems of labor and labor unions, railways, public utilities, and finally the principles underlying taxation.

Twenty-seven lessons (five credits). Mr. Kozelka. \$17.00.

- 25-26. Principles of Accounting. This is a course containing all the fundamental principles of accounting, together with sufficient practice work to show the application of these principles. The emphasis throughout is put upon principle rather than upon the details of method; but the practice material is made to conform to present-day methods as nearly as possible, and the course demonstrates what service accounting should render to business.

Part I treats of the fundamentals of debit and credit, the books of account, standard methods of recording transactions, accruals and adjustments, construction and interpretation of balance sheets and income statements, classification of accounts, the distinction between capital and revenue, and an introduction to partnerships. No previous knowledge of bookkeeping is required.

Twenty-two lessons (four credits). Mrs. Youngs. \$14.00.

Part II is built up with corporation accounting as its leading feature, but gives further consideration to partnerships, and to certain essential accounting principles, such as valuation, depreciation, capital, and revenue. These general principles will be emphasized and made clear by application to various businesses by means of problems, in which manufacturing establishments will be included.

Twenty-two lessons (four credits). Mrs. Youngs. \$14.00.

51. Business Law A—Contracts and Agency. Contracts: Formation of contracts, offer and acceptance, consideration, capacity of parties, minors,

married women, misrepresentation, fraud, legality of objects, the operation of contracts, interpretation of contracts, methods of discharging contracts. Agency: Methods of forming the relation of agency, who may act as agent, who may act as principal, liabilities of principal to third parties, liabilities of agents, termination of agency.

The general rules of contracts being fundamental to all work in business law, this course must precede Business Law B, C, and D.

Sixteen lessons (three credits). Mr. Jackman. \$10.00.

52. Business Law B—Sales, Bailments, Negotiable Instruments. Negotiable instruments, nature and characteristics, definition; the uniform negotiable instruments law, essentials, nonessentials, negotiations, indorsements and delivery, holder in due course and his rights, notice of dishonor, protest, checks. Bailments: definitions, distinction between real and personal property, nature of bailment, rights of bailor, rights of bailee. Sales of personal property: definition of a sale; when the title passes to the buyer; rights of the seller (a) to set the contract aside on the ground of fraud, (b) the seller's lien for the purchase money, (c) right of stoppage in transit; rights of the purchaser to demand (1) goods of a certain quality, (2) warranty of the purchaser's title. Prerequisite: Business Law A.

Sixteen lessons (three credits). Mr. Jackman. \$10.00.

53. Business Law C—Partnerships, Corporations, and Bankruptcy. Partnerships: formation of partnerships; articles of co-partnership; methods of terminating partnerships; rights and obligations of partner (a) toward his co-partners, (b) as an agent of the firm, (c) toward the firm's creditors, (d) for an accounting; special partners; limited partnerships.

Joint stock companies; how distinguished from ordinary partnerships; how like ordinary partnerships; statutory requirements.

Corporations: formation of corporations of various classes; terminations of corporations; membership in corporations, methods of transferring interest, fraudulent issuance of stock by corporate officers; rights of stockholders (a) to dividends, (b) to inspect and control corporate affairs; liabilities of stockholders (a) on stock subscriptions, (b) to pay assessments, (c) for the corporate debts; the doctrine of ultra vires; rights and obligations of corporate directors; corporate mergers and consolidations; domestic and foreign corporations; solvency and the national bankruptcy act. Prerequisite: Business Law A.

Sixteen lessons (three credits). Mr. Jackman. \$10.00.

- 54c. Business Law D—Real Property, Mortgages. Classification of property, distinction between real and personal property; estates in land, freehold, life estate, tenancy for a term, at will, at sufferance; estate held jointly or in common, equitable estates, relative rights of adjoining owners, trespass, easements, sales of real property, the contract to sell, conveyances, wills, mortgages and liens, landlord and tenant, the lease, assignment and subletting, rent, and remedies for non-payment. Prerequisite: Business Law A.

Sixteen lessons (three credits). Mr. Jackman. \$10.00.

80. Economic History I. This is a general course in economic history and includes a survey of the development of agriculture, manufacture, transportation, and storage, and the exchange of goods; economic crises; land, capital, management, and labor; the interplay of economic and political forces.  
Twenty-four lessons (four and one-half credits). Mrs. Mudgett.  
\$15.00.
81. Economic History II. This is a continuation of Course 9, which is a prerequisite to it.  
Twenty-four lessons (four and one-half credits). Mrs. Mudgett.  
\$15.00.
160. Corporation Finance, see page 19.
161. Labor Problems and Trade Unionism. Origin of the labor problem; conditions of labor in American industries; structure, aims, policies, and methods of trade and industrial unionism and employers' associations; collective bargaining and shop committee; mediation and arbitration; injunctions; labor legislation. Prerequisite for credit: 20 credits in social science including Principles of Economics I and II.  
Sixteen lessons (three credits). Mr. Graves. \$10.00.
176. Commercial Policies. Theory of international commerce, free trade, reciprocity, protection, and other governmental and organized efforts to affect trade, with special emphasis upon American policies in view of post-war conditions. Prerequisites for credit: Principles of Economics I and II. Several texts must be read in addition to those on which the course is based.  
Sixteen lessons (three credits). Prof. Blakey. \$10.00.
- 191-192. Public Finance. Government revenues, expenditures, and debts. This includes a study of the various forms of taxation, of budgetary legislation and control, of war and emergency financing, of the shifting and incidence of taxation, and of fiscal reforms. Prerequisite for credit: Principles of Economics I and II.  
Twenty-four lessons (four and one-half credits). Prof. Blakey.  
\$15.00.

## EDUCATION

NOTE.—See Courses 1 and 2 under Psychology.

1. 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. Statistics will receive some emphasis. Courses 1 and 2 in psychology are prerequisite.  
This course may be substituted for Ed. 55.  
Sixteen lessons (three credits). Asst. Prof. Sorenson. \$10.00.
- 3c. History of Education to the Reformation. A historical study of the foundation of modern education. The theories and practices of the

Hebrews, Greeks, and Romans, and of the Middle Ages and the Renaissance, are considered in the light of their influence upon the present educational situation. The course includes the work offered in residence Course 101. Prerequisite: six credits in psychology. In special cases these prerequisites may be waived.

Twenty-four lessons (four and one-half credits). Miss Alexander.  
\$15.00.

- 4c. *History of Modern Education.* Educational history since the time of the Renaissance. A study of the theory of the great modern educators; the origin, aims, and development of typical secondary and higher schools in various countries; the rise of the modern elementary school with emphasis upon early state systems and reform movements. Equivalent in part to residence Courses 102 and 103. Prerequisite: six credits in psychology.

Twenty-four lessons (four and one-half credits). Miss Alexander.  
\$15.00.

- 7c. *Industrial Education.* The principles fundamental to vocational training in the public school system as affecting the arrangement of school years, the course of study, and the methods of teaching. Prerequisite for credit: Courses 3 and 4.

Twenty-four lessons (four and one-half credits). Prof. Rankin.  
\$15.00.

- 8c. *Theory of Teaching.* An introductory course in educational theory for elementary school teachers. The work includes a study of the principles upon which the present practice of teaching is based, and of the responsibility of the school in providing various forms of training. Other topics are considered briefly, such as types of classroom, exercises, the making of lesson plans, qualifications of teachers, school management. Prerequisite: six credits in psychology. In special cases a student may, by conference with the instructor, waive these prerequisites.

Twenty-four lessons (four and one-half credits). Miss Alexander.  
\$15.00.

- 9c. *School Organization and Law.* An introductory course in the organization and management of schools in American communities, with special reference to the duties of school boards and school superintendents, principals, and teachers, to the methods and equipment proper to schools of various grades, and to the main facts in the school law of Minnesota. Prerequisite for credit: Courses 3 or 4.

Twenty-seven lessons (five credits). Prof. Rankin. \$17.00.

- 10c. *School Sanitation.* This course is designed for those who are concerned with schools of any and all grades. It deals with conditions affecting the health of school children of all ages. School architecture, courses of study, and the discipline of the school will be considered as well as all other questions affecting the well-being of pupils. Prerequisite for credit: Courses 3 and 4.

Twenty-seven lessons (five credits). Prof. Rankin. \$17.00.

- 12c. Social Aspects of Education. This course is concerned with the school as an environment which is designed to fit its pupils for their social relations; also it discusses the school in respect to its interaction with other institutions of a similar character and aim. It is a common remark that the school is becoming more and more a social institution, and this course attempts to determine in what respect and in what manner this is true. Prerequisite for credit: Psychology 1 and 2.

This course may be substituted for H.Ed. 3, Educational Sociology.

Twenty-seven lessons (five credits). Prof. Rankin. \$17.00.

13. Industrial History. Evolution of arts, industry, tools, processes, and production to 1800; evolution of economic and social conditions; culmination of the industrial revolution in America—resultant agricultural, industrial, economic, and social problems; twentieth century outlook and opportunities; implications for practical education.

Eleven lessons (two credits). Prof. Rankin. \$7.00.

NOTE.—This course carries credit only in the College of Education. Students desiring credit in the School of Business Administration should apply to the dean of that school.

16. The High School. A comprehensive study of the modern secondary school. The course treats the growth of secondary education, the student body, aims and functions, present status and types of organization, the program of study, extra-curricular activities, classification and guidance, and certain administrative features. Prerequisite: Psychology I and II and five credits in Education.

Equivalent to Ed. Ad. 65.

Sixteen lessons (three credits). Mr. Overn. \$10.00.

17. Junior High School. A study of the special purposes of this institution and appropriate reorganization to achieve them, including the organization and content of the curriculum, advisory system, social organization (extra-curricular activities), methods of teaching, departmentalization, promotion, staff, etc. Prerequisite: Psychology I and II and five credits in Education.

Equivalent to Ed. Ad. 167-168.

Sixteen lessons (three credits). Mr. Overn. \$10.00.

### ENGINEERING

1. Shop Mathematics, Part I. This course is for the practical man who desires training in mathematics to solve mechanical and electrical problems and will be found valuable by the teacher who is preparing to teach applied mathematics under the Smith-Hughes Act. It takes up arithmetic from fractions through proportion and contains problems in areas, volumes, weights of materials, screw threads, and gears. It teaches logarithms, the use of the slide rule, and the fundamental elements of machines, such as levers, pulleys, and the inclined plane.

Twenty-four lessons (extension credit only). Asst. Prof. Edwards.

\$15.00.

2. Shop Mathematics. Part II. This work follows Part I and takes up algebra, geometry, and trigonometry from a practical shop standpoint. A thoro working knowledge of the formulae is given. Each lesson in both Parts I and II has numerous practical problems to be worked by the student.  
Twenty-four lessons (extension credit only). Asst. Prof. Edwards.  
\$15.00.
- \*3. Elementary Mechanical Drawing. This is a course for beginners; no previous drawing instruction or experience is assumed. The course includes the use of instruments, lettering, views and sections, conventions, sketching, dimensioning, completed working drawings, and tracing.  
Twenty lessons (extension credit only). Assoc. Prof. French.  
\$12.50.
- \*4. Advanced Mechanical Drawing. Machine drawing constitutes the larger part of this course. However, the work is made somewhat general by the inclusion of exercises in structural drawing, map drawing, chart and diagram drawing, and the mathematics of design.  
Twenty lessons (extension credit only). Assoc. Prof. French.  
\$12.50.
5. Elementary Mechanics. A short, practical course in elementary mechanics designed to meet the needs of students who have had limited training in mathematics. Numerical and simple graphical calculations, forces, simple machines, velocity, acceleration, impulse, momentum, work, power, and energy are treated. This course is designed for those who desire an elementary knowledge of the subject, but who are not familiar with calculus. Prerequisite: Courses 1 and 2 or equivalent.  
Twenty-four lessons (extension credit only). Assoc. Prof. Teeter.  
\$15.00.
6. Technical Mechanics I—Statics. Characteristics of a force, parallelogram law, moments, couples, resultant of a force system, equilibrium of a force system, frictions, centroids. Motion of a particle, motion of a rigid body. Prerequisite: Mathematics, Course 11.  
Twenty-seven lessons (extension credit only). Assoc. Prof. Teeter.  
\$17.00.
7. Technical Mechanics II—Dynamics and Kinematics. Moments of inertia, force, mass, acceleration, translation and rotation, gyroscope, governors, work, energy, power, conservation of energy, impulse, momentum, loss of kinetic energy, conservation of momentum. Prerequisite: Course 6.  
Twenty-seven lessons (extension credit only). Assoc. Prof. Teeter.  
\$17.00.

\* May be taken for one-fourth entrance unit. It is impossible to quote prices on drawing outfits. The cost will probably be from \$8 to \$12.

8. Strength of Materials—Elementary. An elementary course on the strength of materials in common use. It treats of properties of materials, stress and strain, elastic limit, ultimate strength, deformation, deflection, principle of moments, moments of inertia, and the general elemental theory of beams, columns, and shafts. This course is especially designed for those students who desire an elementary knowledge of the subject, but who are not familiar with calculus. Prerequisite: Courses 1, 2, and 5.  
Sixteen lessons (extension credit only). Assoc. Prof. Teeter.  
\$10.00
9. Strength of Materials—Technical. Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, hollow cylinder, rollers, plates, curved bars, springs, dynamic stresses, true stresses. Prerequisite: Mathematics, Course II.  
Twenty-seven lessons (extension credit only). Assoc. Prof. Teeter.  
\$17.00
10. 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. Prerequisite: Mathematics, Course II.  
Twenty-two lessons (extension credit only). Assoc. Prof. Teeter.  
\$14.00
11. Electricity and Magnetism, Part 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. A knowledge of arithmetic such as is given by Shop Mathematics I is necessary.  
Twenty-four lessons (extension credit only). Asst. Prof. Edwards.  
\$15.00
12. Electricity and Magnetism, Part II. This course is a continuation of Part I. It will deal with motors, generators, and instruments.  
Twenty-four lessons (extension credit only). Asst. Prof. Edwards.  
\$15.00
13. Alternating Currents. This course takes up simple laws of alternating currents and their application to machines; inductance, capacity, and impedance are fully treated.  
Twenty lessons (extension credit only). Asst. Prof. Edwards.  
\$12.50
14. Heating and Ventilating. The course is intended to meet the needs of those who wish to know about the principles and installation of heating and ventilating apparatus. The work will include an introduction and study of heat, heat losses, heat loss due to ventilation, ventilation prac-

tice, air conditioning, heating systems—steam and hot water, direct and indirect, use of exhaust steam, warm-air system, fan systems—plenum and exhaust systems, vacuum systems, piping systems, central station heating, and heating accessories.

Sixteen lessons (extension credit only). Assoc. Prof. Martenis.  
\$10.00.

16. Boiler Room Practice. The course is intended for the boiler operator. Outline of course: combustion, coal; firing methods; flue-gas analysis; boiler construction; feed water; boiler fittings; power of boilers; care of boilers; pipes and fittings; pipe covering; steam tables.

Sixteen lessons (extension credit only). Assoc. Prof. Martenis.  
\$10.00.

17. Engine Room Practice. The course is planned to give an elementary and plain presentation of the subject to operating engineers who are not able to comprehend fully the average textbook on steam engines. Outline of course: principles of energy, motion, steam; classes of steam engines; parts of the steam engine; valves and steam action; valve-setting; governing; reversing gears; indicators and cards; calculating horse-power; pumps, condensers, lubrication; engine troubles.

Twenty lessons (extension credit only). Assoc. Prof. Martenis.  
\$13.50.

NOTE.—For those who are in boiler room practice and who may wish to take an examination for a chief engineer's license, Courses 1, 16, and 17 are of the utmost importance.

18. Elements of Machine Design. A short, practical course in machine design. Some elementary machines will be discussed and the laws of mathematics, mechanics, and strength of materials will be applied in each case, leading to the complete design of the particular machine under consideration. Working details and general drawings will be made as the work advances. Prerequisites: Courses 1, 2, 3, 4, 5, and 8.

Twenty-four lessons (extension credit only). Asst. Prof. Edwards.  
\$15.00.

19. Descriptive Geometry. An elementary course in methods of projection and developments as applied to engineering, drawing, template making, etc. Correlated with analytic geometry. Graphical and algebraic solutions.

Twenty-seven lessons (extension credit only). Assoc. Prof. Teeter. \$17.00.

20. Lumber and Its Uses. Structural and physical properties of wood, standard grades and sizes, structural timbers, seasoning and preservation, paints and stains, lumber prices, cost of wood construction, specific uses of woods, and selection of materials.

Ten lessons (extension credit only). Prof. Cheyney. \$8.00.



## 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 at 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). Miss Holmberg. \$12.50.
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. Special emphasis is placed on punctuation and letter writing. Prerequisite: Course 1 or equivalent.  
Twenty lessons (one-half entrance unit). Miss Holmberg. \$12.50.
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. Prerequisite: Courses 1 and 2 or equivalent.  
Twenty lessons (one-half entrance unit). Miss Holmberg. \$12.50.
4. English Composition D. This course is a continuation of Course 3, and corresponds to high school senior English composition. Prerequisite: Courses 1, 2, and 3 or their equivalent.  
Twenty lessons (one-half entrance unit). Miss Holmberg. \$12.50.
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 set 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). Miss Grandy. \$12.50.
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). Miss Grandy. \$12.50.

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. Prerequisite: Courses 5 and 6 or equivalent.

Twenty lessons (one-half entrance unit). Miss Grandy. \$12.50.

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. Prerequisite: Courses 5, 6, and 7 or equivalent.

Twenty lessons (one-half entrance unit). Miss Grandy. \$12.50.

#### COLLEGE COURSES

##### *Literature*

- 1c. History of English Literature I. A general course. A survey of English literature from the earliest times to 1630, with emphasis on the historical background. Illustrative readings from collections of the most famous poetry and prose. The history of the English stage and a study of two or more of Shakespeare's plays is included here. The preparation of a long paper on an assigned subject gives some intensive study on one aspect of the general reading.

Sixteen lessons. (No credit.) Miss Grandy. \$10.00.

- 2c. History of English Literature II. A general course. A survey of English literature from 1630-1780. A continuation of History of English Literature I. The more important authors covered include Milton, Addison and Steele, Swift, Johnson, Goldsmith, and Gray.

Sixteen lessons. (No credit.) Miss Grandy. \$10.00.

- 3c. History of English Literature III. A general course. A survey of English literature from 1780-1900. A continuation of History of English Literature I and II. The chief authors studied here include Burns, Scott, Wordsworth, Coleridge, Byron, Shelley, Keats, Lamb, the Victorian poets, and nineteenth century prose writers.

Sixteen lessons. (No credit.) Miss Grandy. \$10.00.

NOTE.—These courses are more advanced than high school work, but do not fulfill any requirement nor give any credit toward graduation. They are planned for the person who wishes detailed guidance in reading for his own pleasure and advancement.

These courses need not necessarily be taken in sequence. Any one course may be taken separately at the discretion of the student.

1. Freshman Literature 1. Intended for students who have had work in composition equivalent to that of A-B-C, but who have not had the study of English classics included in that course. This course carries university credit for the work in literature (prose writers) of English

A. It includes a study of the works of Macaulay, Huxley, Stevenson, and Newman. Prerequisite for credit: Comp. 4-5-6, or 9 credits in composition.

Sixteen lessons (three credits). Miss Grandy. \$10.00.

2. Freshman Literature 2. This course carries university credit for the work in literature of English B. It includes a study of the drama as illustrated by Shakespeare's *Henry IV*, Part 1, *Romeo and Juliet*, and several plays of modern dramatists. Prerequisite for credit: Comp. 4-5-6, or 9 credits in composition.

Sixteen lessons (three credits). Miss Grandy. \$10.00.

3. Freshman Literature 3. This course carries university credit for the work in literature of English C. It includes a study of types of poetry from early ballads to dramatic monologs and free verse. Prerequisite for credit: Comp. 4-5-6, or 9 credits in composition.

Sixteen lessons (three credits). Miss Grandy. \$10.00.

NOTE.—The prerequisite of composition may be met by taking the composition and literature simultaneously.

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, Shakespeare, Spenser, Bacon, the lyric poets of the sixteenth and seventeenth centuries, Browne, Milton, and Dryden. Prerequisite for credit: Composition 4, 5, and 6.

Twenty-seven lessons (five credits). Asst. Prof. Hotson. \$17.00.

22. Introduction to Literature II. A continuation of 21. Addison and Steele, Swift, Pope, Fielding, Johnson, Boswell, and Sheridan.

Twenty-seven lessons (five credits). Asst. Prof. Hotson. \$17.00.

23. Introduction to Literature III. A continuation of 22. Wordsworth, Coleridge, Lamb, Byron, Shelley, Keats, Carlyle, Tennyson, Browning, and Arnold.

Twenty-seven lessons (five credits). Asst. Prof. Hotson. \$17.00.

- †31. The English Novel I. The course embraces the history and development of the English novel from Defoe to Scott. Emphasis is laid on the careful reading of the novels themselves, aided by a knowledge of the historical and literary background obtained from a textbook. The student is encouraged to read widely and is asked to note especially the differences in subject-matter and method amongst the novelists studied. The following novels are read: *Robinson Crusoe*, *Joseph Andrews*, *Humphrey Clinker*, *Evelina*, *Pride and Prejudice*, and *Kenilworth*. Prerequisite: Composition 4-5-6.

Sixteen lessons (three credits). Asst. Prof. Hessler. \$10.00.

- †32. The English Novel II. The method here is the same as that of Course 31. Through the reading of *Bleak House*, *Pendennis*, *Barchester*

† Both courses must be completed before credit will be allowed.

*Towers, Jane Eyre, Wuthering Heights, and Adam Bede*, the student is expected to get not only a knowledge of the technique of the various authors, but also some conception of the flavor of the Victorian times. Prerequisites: Composition 4-5-6 and English 31.

- Sixteen lessons (three credits). Asst. Prof. Hessler. \$10.00.
55. Shakespeare I. Shakespeare's development as a dramatist. A careful study of a selected list of Shakespeare's plays. Prerequisite: Composition 4, 5, and 6, and six additional credits in English.
- Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.
56. Shakespeare II. A continuation of Course 55.
- Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.
- †73. American Literature I. A survey of American literary development in the seventeenth, eighteenth, and early nineteenth centuries. Extensive readings, largely from Pattee's *Century Readings in American Literature*. Prerequisite for credit: Composition 4, 5, and 6, and six additional credits in English.
- Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.
- †74. American Literature II. A continuation of 73. A survey of American literary development from Emerson to the end of the nineteenth century.
- Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.

#### *Composition*

NOTE.—All lesson reports in English composition must be returned to the Correspondence Study Department before the final examination may be taken.

- 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. This course is required of all college students who are not prepared to carry college work in English successfully. It includes intensive drill on simple grammatical forms, punctuation, sentence structure, and theme writing.
- Sixteen lessons (no credit). Mrs. del Plaine. \$10.00.
4. Composition IV. Practical training in the art of writing, the principles of structure, and analysis of specimens of good prose. Constant practice in writing papers, mainly expository in character. Composition 4, 5, and 6, fulfill the freshman English requirement.
- Sixteen lessons (three credits). Asst. Prof. Hotson. \$10.00.
5. Composition V. Continuation of Course IV. Advanced work in composition, with practice in writing exposition, narration, and description.
- Sixteen lessons (three credits). Asst. Prof. Hotson. \$10.00.
6. Composition VI. Continuation of Course V. Study of diction, and practice in writing exposition and narration. Completion of this course satisfies the university requirement in English composition.
- Sixteen lessons (three credits). Mrs. del Plaine. \$10.00.
- 7c. Exposition. Imitative and creative work in the various types of exposition, with especial recognition of the way in which exposition merges

† Both courses must be completed before credit will be allowed for any one.

into narration and description. Prerequisite for credit: Courses 4, 5, and 6.

Sixteen lessons (three credits). \$10.00.

11. Description. Non-technical but thorough study and application of the principles of descriptive writing. Analysis of specimens and exercises in description. Prerequisite for credit: Courses 4, 5, and 6.

Sixteen lessons (three credits). Miss Jones. \$10.00.

12. Narration. Study of the principles of narrative writing; point of view, plot, setting, characterization. Exercises, and practice in writing short narratives. Prerequisite for credit: Courses 4, 5, and 6.

Sixteen lessons (three credits). Asst. Prof. Hotson. \$10.00.

- 69c. The Short Story I. Practical training in the art of writing the short story, in its technique and principles, and analysis of assigned specimens. Exercises in plot, setting, and character. Prerequisite for credit: Courses 4, 5, 6, and 12.

Sixteen lessons (three credits). Asst. Prof. Phelan. \$10.00.

- 70c. The Short Story II. A continuation of Course 11.

Sixteen lessons (three credits). Asst. Prof. Phelan. \$10.00.

Registration accepted after November 1, 1929.

86. Versification I. 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.

Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.

87. Versification II. A continuation of Course 86.

Sixteen lessons (three credits). Asst. Prof. Nichols. \$10.00.

#### 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). Dr. Wendell. \$10.00.

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, with a view to acquiring the style and elegance of expression which the language, like national languages, has in its own way.

Sixteen lessons (no credit). Dr. Wendell. \$10.00.

#### GEOLOGY

1. Dynamic and Structural 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). Assoc. Prof. Thiel. \$17.00.

## GERMAN

## PREPARATORY COURSES

1. German A. Introduction to the elements of German grammar, and simple exercises in composition. Equivalent to the first half year of high school German.  
Twenty lessons (one-half entrance unit). Prof. Burkhard. \$12.50.
2. German B. Continuation of German A. Equivalent to the second half year of high school German.  
Twenty lessons (one-half entrance unit). Prof. Burkhard. \$12.50.
3. German C. Continuation of German B. Equivalent to the third half year of high school German.  
Twenty lessons (one-half entrance unit). Prof. Burkhard. \$12.50.
4. German D. Continuation of German C. Equivalent to the fourth year of high school German.  
Twenty lessons (one-half entrance unit). Prof. Burkhard. \$12.50.

## COLLEGE COURSES

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before the final examination may be taken.

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). Prof. Burkhard. \$17.00.
2. Beginning German II. A continuation of Course 1.  
Twenty-seven lessons (five credits). Prof. Burkhard. \$17.00.
3. Beginning German III. Grammar and composition continued; selected readings in easy prose and verse. Prerequisite: Courses 1 and 2 or equivalent.  
Twenty-seven lessons (five credits). Prof. Burkhard. \$17.00.
4. Rapid Reading I. Selections from modern narrative and descriptive prose. Assigned outside readings and reports. Prerequisite: Courses 1, 2, and 3 or equivalent.  
Twenty-seven lessons (five credits). Prof. Kroesch. \$17.00.
- 28-29. Chemical German. The reading of works on chemistry. Vocabulary exercises. Both parts must be completed before credit is given. Prerequisite: Course 4 or equivalent.  
Part I, sixteen lessons (three credits). Asst. Prof. Lussky.  
\$10.00.  
Part II, sixteen lessons (three credits). Asst. Prof. Lussky.  
\$10.00.
31. Medical German I. Readings in medical German. This course is intended primarily for medical students. It aims to give the student a scientific vocabulary and to acquaint him with the style of scientific

- articles. Prerequisite: Course 4 or equivalent. No credit given until Course 32 is completed.  
Sixteen lessons (three credits). Prof. Burkhard. \$10.00.
32. Medical German II. A continuation of Course 31. No credit is given for 31 until 32 is completed.  
Sixteen lessons (three credits). Prof. Burkhard. \$10.00.
50. Elementary Composition I. Translation of short English selections. Paraphrasing of simple poems. Free narration. Exercises based on topical grammar review. Open to those who are taking or have taken Course 4 or equivalent.  
Sixteen lessons (three credits). Asst. Prof. Lussky. \$10.00.
52. Elementary Composition II. Translation and grammar review continued. Both 50 and 52 must be completed before credit is given for 52.  
Sixteen lessons (three credits). Asst. Prof. Lussky. \$10.00.
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). Asst. Prof. Davies. \$15.00.
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). Asst. Prof. Davies. \$15.00.

## 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. Courses 1 and 2 must be completed before credit is given for Course 1.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.
- \*2. Beginning Greek II. Course continued; general principles, inflections, word formations, syntax, elementary readings, composition. Prerequisite: Course 1.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.
3. Beginning Greek III. Course continued. Prerequisite: Courses 1 and 2.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.
14. History—Xenophon's *Anabasis*; selections from Books 2, 3, 4, or their equivalent; Hadley's *Greek Grammar*; etymology reviewed and syntax studied sufficiently to enable the student to proceed confidently in the translation of the text; the irregular verb. Prerequisite for credit: Courses 1, 2, and 3 or equivalent.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.

\* May be taken for one-half entrance unit.

15. History—Herodotus. Selected readings from Herodotus's history; syntax, dialectical forms, the irregular verb; collateral work.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.
16. Epic Poetry—Elementary Course in Homer. Selections from the *Iliad* or the *Odyssey*; mythology, scansion, dialectical forms. Open to those who have read in Greek prose three books of the *Anabasis*, or the equivalent.  
Twenty-seven lessons (five credits). Prof. Savage. \$17.00.
51. Philosophy. Plato's *Apology* or selections from other works of Plato; study of Greek philosophy. Open to those who have had at least two years of Greek. Prerequisite for credit: Courses 4 to 6 or equivalent.  
Sixteen lessons (three credits). Prof. Savage. \$10.00.
52. Oratory. Selected readings from Lysias and Demosthenes; study of the principles of Greek rhetoric and Greek oratory.  
Sixteen lessons (three credits). Prof. Savage. \$10.00.
53. Dramatic Poetry—Elementary Course in the Drama. Euripides' *Alcestis* or *Medea*; translation, study of mythology and of Greek life. Open to those who have read at least two books of Homer in addition to three books of the *Anabasis*, or the equivalent.  
Sixteen lessons (three credits). Prof. Savage. \$10.00.

## HISTORY

## PREPARATORY COURSES

1. American History. This is a course in United States history similar to that taken by third- and fourth-year students in the high school. Since it presupposes a course in the same subject in the grades, the approach is made in a somewhat different manner from that in an elementary course. More emphasis is placed on the relative importance of periods and events, on the causes and relations of events, and upon securing a broader view of our country's history. The supplementary reading is assigned with the notion that it may suggest as well as inform. The following topics are treated with especial fulness: social and economic life of the colonists, English colonial policy, the Revolution, its causes and results, the establishment of the new government, the importance of the West in national growth, rise of sectional interests and the resultant conflict, economic development after the Civil War, and our awakening interests in foreign affairs.  
Part A, twenty lessons (one-half entrance unit). Dr. Tohill.  
\$12.50.  
Part B, twenty lessons (one-half entrance unit). Dr. Tohill.  
\$12.50.
2. World History. A course corresponding to that taken in the second or third year of high school, including a survey of the development of civilization from prehistoric man to the present time. Part A through 1815, stresses such topics as oriental, Greek, Roman, and medieval civilizations, the Reformation, rise of national states, colonial rivalry,



the French Revolution, Napoleon, and the Congress of Vienna. Part B stresses the economic, social, and political aspects of the Industrial Revolution, the development of modern democracy in the various countries of Europe, imperialism in Africa and the Far East, the World War, the world today.

Part A, twenty lessons (one-half entrance unit). Miss Gold. \$12.50.

Part B, twenty lessons (one-half entrance unit). Miss Gold. \$12.50.

## COLLEGE COURSES

1. Modern World, Part I (1500-1795). A study of political and social history, primarily of Europe, from the Reformation to 1795.  
Twenty-seven lessons (five credits). Mrs. Mudgett. \$17.00.
2. Modern World, Part II (1795-1871). The Napoleonic period, the reaction and the unification of Italy and Germany.  
Twenty-seven lessons (five credits). Mrs. Mudgett. \$17.00.
3. Modern World, Part III (1871-1924). The period of the benevolent bourgeoisie, modern imperialism, international relations, the World War, and the post-war settlement.  
Twenty-seven lessons (five credits). Mrs. Mudgett. \$17.00.
4. English History, 1066 to 1603, Part I.—Medieval. A study of English history from the Norman Conquest to the accession of the Stuarts. The work consists of a careful study of a narrative text and of a constitutional manual, supplemented by source study and collateral reading. Special emphasis is placed upon the beginnings of popular government as shown in jury trial, the limited monarchy idea, and the growth of the House of Commons.  
Twenty-seven lessons (five credits). Mrs. Mudgett. \$17.00.
5. English History, 1603 to Present, Part II—Modern. A continuation of Part I, devoted to a study of English history from 1603 to the close of the World War. The emphasis is upon the seventeenth-century struggle for political liberty, and upon the reform movements of the nineteenth and twentieth centuries. Prerequisite: Course 4.  
Twenty-seven lessons (five credits). Mrs. Mudgett. \$17.00.
- \*7. American History I (1500-1840). Survey of the development of the United States to about 1840, with special reference to the growth of democratic institutions, the influence of the West, and the growing nationalism. Prerequisite: ten credits in history for freshmen; others no prerequisites.  
Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00.
- \*8. American History II (1840-77). Survey of the background of the Civil War, the war and reconstruction, with special reference to slavery, westward expansion, the frontier, the public land questions, and the social, political, and economic systems before and immediately following the war. Prerequisite: ten credits in history for freshmen; others, no prerequisites.  
Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00.

\* To receive credit for Course 7, a student must complete both 7 and 8. To receive credit for Course 8, a student must complete either 7 and 8 or 8 and 9.

## CORRESPONDENCE COURSES

- \*9. Recent American History. The national period after 1877. Special emphasis on the social and economic factors. Includes a study of the World War and the post-war readjustment in the United States. Prerequisite: ten credits in history for freshmen; others, no prerequisites. Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00.
- 11c. Ancient History, Part I—Greece and the East. This course includes a brief preliminary survey of Egypt, Babylonia, and the Aegean region, showing their influence on later civilization, followed by a study of Greek history, with special stress on the development of Sparta and Athens, the Persian Wars, the Age of Pericles, the interrelation of politics with the artistic and literary development, and finally the conquests of Alexander and the diffusion of Greek civilization over the East. Prerequisites: ten credits in history. Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00.
- 12c. Ancient History, Part II—Roman. A course in Roman history, including the rise of Rome from a petty city to the position of mistress of the ancient world, the great struggle with Carthage, the causes that led to the fall of the Republic, the transition to the Empire, and its history to the death of Constantine. Prerequisites: ten credits in history. Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00.
- 15c. Europe in the Middle Ages (800-1500). A study of western European history from the time of Charlemagne to the end of the fifteenth century. Prerequisite: ten credits in history for freshmen; others, no prerequisites. Twenty-seven lessons (five credits). Asst. Prof. Perry. \$17.00. Registrations accepted October 1, 1929.

## ECONOMIC HISTORY

- Economic History I. See Economics 9.  
Economic History II. See Economics 10.

## HOME ECONOMICS

(For courses in Interior Decorating see Art Education.)

1. Household Budget. This course deals with the cost and care of the home. Topics covered: budget making; household accounting; foods and marketing; home ownership; clothing costs; principles of arrangement of furnishings and utensils; social adjustments. A practical course for the home-maker as well as for the college student. Sixteen lessons (three credits). Miss Kelley. \$10.00.
2. Textiles. The study of woven and knitted fabrics in current use for household purposes, outerwear and underwear; aims to emphasize points about quality of raw material, processes of manufacture, and features of construction and finish as they affect the serviceability and appearance of materials. Tests for quality, applicable to ready-to-wear garments as well as to yard goods. Significance of trade terms used in newspaper and magazine advertising. New points about rayon and other materials will be added as they develop. The practical ideas

found in research reports will be included. Access to a compound microscope desirable but not imperative. A fee of \$1.50 for laboratory material is required, payable at time of registration.

Sixteen lessons (three credits). Miss Caplin. \$10.00.

### HYGIENE

- 1.\* Hygiene of Maternity and Infancy. Prepared by the Division of Child Hygiene of the Minnesota Department of Health in co-operation with the United States Children's Bureau in work authorized under the Sheppard-Towner Act of November 1921. The first eight lessons take up personal and prenatal hygiene; care of the expectant mother; common complications and how to avoid them; preparation for confinement and after care of mother and child. The remaining lessons deal with the care and feeding of the baby; the well baby; the sick baby; growth, development, training. This course is given in co-operation with federal and state agencies without charge to the student.

Fifteen lessons (no credit). Dr. Hartley. Free.

### INTERIOR DECORATING

(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; explanation of various newspaper policies in obtaining rural news coverage; analysis of rural neighborhood groups and their news interests; study of the obligations of the rural reporter to himself, to his neighborhood, and to his newspaper; practical exercises in the gathering and writing of rural news.
- Sixteen lessons (three credits). Mr. McCoy. \$10.00.
13. Reporting I.† Gathering and writing of news for newspapers; study of news values; exercises in journalistic style; analysis of newspapers. Part I takes up the study of news and news values, the requirements of style in straight news-writing, and the structure of news stories, based upon the study of newspapers.
- Sixteen lessons (three credits). Mr. Desmond. \$10.00.
14. Reporting II.† Continuation of Part I. Emphasis upon the actual getting and writing of news for newspapers. Assignments will be of a practical nature, the stories to be written for publication.
- Sixteen lessons (three credits). Mr. Desmond. \$10.00.
15. Reporting III.† Continuation of Part II. The practical getting and writing of news will be continued with emphasis upon the human interest and feature story.
- Sixteen lessons (three credits). Mr. Desmond. \$10.00.

\* Offered to residents of Minnesota only.

† No credit will be given until Courses 13, 14, and 15 are completed.

- 16c. News Gathering for Clubs and Organizations. A specially prepared course designed to assist the publicity committees of clubs and similar organizations to understand the newspaper, recognize news, and gather and prepare it in such a way that the newspapers will consider it available for publication; with a brief discussion of publicity media other than the press.  
Sixteen lessons (three credits). Asst. Prof. Steward. \$10.00.
20. Editorial Writing I. Study of the style and structure of editorials; practice in writing various types of editorials.  
Sixteen lessons (no credit). Mr. Desmond. \$10.00.
21. Editorial Writing II. The writing of editorials is continued with the study of the editorial page, its functions, typography and special problems.  
Sixteen lessons (no credit). Mr. Desmond. \$10.00.
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, which is to say, on the article of fact rather than that of opinion, but lines are not too strictly drawn. A survey of the magazine and Sunday newspaper fields is begun. Prerequisite for credit: one year of reporting.  
Sixteen lessons (three credits). Asst. Prof. Steward. \$10.00.
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, and a consideration of the illustration, preparation, and selling of manuscripts.  
Sixteen lessons (three credits). Asst. Prof. Steward. \$10.00.
83. The Supervision of School Publications. A practical consideration of the problems which face the high school teacher who supervises the newspaper, magazine, or yearbook. The course includes the consideration of such subjects as editorial content, staff organization, editing, headlines, typography, make-up, business management, publication costs, engraving, photography, and others.  
Sixteen lessons (three credits). Mr. Kildow. \$10.00.

## LATIN

NOTE. A.—To students desiring to take courses in Latin for entrance credit:

Course 1 is the equivalent of first year high school Latin.  
Courses 2 and 3 are the equivalent of second year high school Latin.  
Courses 9 and 10 are the equivalent of third year high school Latin.  
Courses 11 and 12 are the equivalent of fourth year high school 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 B.—All lesson reports in language courses must be returned to the Correspondence Study Department before the final examination may be taken.

\*1. Beginning Latin I. Inflections; translation of easy Latin prose; the study of elementary syntax; Latin composition. Textbook: D'Ooge: *Elements of Latin*.

Twenty-seven lessons (five credits). Asst. Prof. Cram. \$17.00.

\*2. Beginning Latin II. A continuation of Course 1. Translation of selections from Eutropius; forms; syntax; Latin composition. Prerequisite: Latin I or its equivalent. Textbooks: Beeson and Scott, *New Second Latin Book*.

Twenty-seven lessons (five credits). Asst. Prof. Cram. \$17.00.

\*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. Prerequisites: 1 and 2 or equivalent. Textbooks: Beeson and Scott, *New Second Latin Book*; Bennett, *Latin Grammar and New Latin Composition*.

Twenty-seven lessons (five credits). Asst. Prof. Cram. \$17.00.

\*9. Cicero I. Translation of the First and Second Oration against Catiline and of selected Letters; syntax; composition; life of Cicero. Textbooks: Kelsey's *Cicero*, Bennett's *Grammar and New Latin Composition*. Open to those who have completed two years of preparatory Latin.

Twenty-seven lessons (five credits). Asst. Prof. Cram. \$17.00.

\*10. Cicero II. Translation of the Oration for the Manilian Law (the equivalent of two orations), the Archias, and the Marcellus; syntax; composition. Textbooks: same as in Course 9. Prerequisite: Course 9.

Twenty-seven lessons (five credits). Asst. Prof. Cram. \$17.00.

\*11. Virgil's *Aeneid* I. The course will cover the first two books of the *Aeneid* and include the study of the life and times of Virgil, the principles of Latin prosody, the literary style of the *Aeneid*, and, to a limited extent, Roman mythology. Open to those who have completed three years of preparatory Latin or Course 9. Textbook: Knapp's *Aeneid of Virgil*, revised edition, Books I-VI and Selections VII-XII published by Scott, Foresman.

Twenty-seven lessons (five credits). Prof. Pike. \$17.00.

\*12. Virgil's *Aeneid* II. Books 3, 4, 6 of the *Aeneid*. Textbook: *Virgil's Aeneid* revised, Books I-VI and Selections VII-XII by Charles Knapp, Bennett's *Latin Grammar*. The student will, besides, be expected to read and report on Sellar's *Virgil*. Open to those who have completed Course 11.

Twenty-seven lessons (five credits). Prof. Pike. \$17.00.

21. Livy, Book I. The work will comprise the study of the text, the life, times, and literary style of Livy, and, in some measure, early Roman institutions, and lastly, Latin composition. Textbooks, Westcott's *Livy*,

\* May be taken for one-half entrance unit.

Book I, Bennett's *Latin Grammar*, and White's *Latin-English Lexicon*. The student will also read and report on Ida Thallien Hill's *Rome of the Kings*, published by E. P. Dutton & Co. Open to those who have completed four years of preparatory Latin or 13.

Twenty-four lessons (four and one-half credits). Prof. Pike.  
\$15.00.

23. Plautus and Terence: Selections. The course will consist of a study of the texts, the literary styles of Plautus and Terence, and an outline of the history and technique of the Roman drama. Textbooks: *Plautus Menacchmi* by Fowler, *Terence's Phormio* by Elmer, and White's *Latin-English Lexicon*. The student will also be required to read and report upon Sellar's *Plautus and Terence in The Roman Poets of the Republic*. Open to those who have completed Course 21.

Twenty-four lessons (four and one-half credits). Prof. Pike.  
\$15.00.

### LIBRARY TRAINING

The University of Minnesota has established a Division of Library Instruction, and it is planned to offer courses and curricula leading to complete preparation for library service. In connection with this new department there will probably be offered, by correspondence, a limited number of courses in Library Training. These courses have not yet been decided upon, and cannot be announced for a little time. Those interested in such training by correspondence should write to this department and information will be sent out as soon as it is ready.

### MATHEMATICS†

#### PREPARATORY COURSES

1. Elementary Algebra A. A course for students who have never studied algebra. The 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). Asst. Prof. Edwards.  
\$12.50.

2. Elementary Algebra B. This course, with Course 1, constitutes one entrance unit in mathematics. The course 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). Asst. Prof. Edwards.  
\$12.50.

3. Plane Geometry A. The work of this course is elementary geometry, Books I and II. Rectilinear figures and the circle, with the miscella-

† See also Engineering, Courses 1, 2, 19.

neous original exercises and some elementary construction problems.  
Prerequisite: Courses 1 and 2.

Twenty lessons (one-half entrance unit). Asst. Prof. Edwards.  
\$12.50.

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). Asst. Prof. Edwards.  
\$12.50.

5. Solid Geometry. This course is designed not only to give a knowledge of the standard theorems and exercises of the text, but to develop the student's own imagination and initiative and to give a well-rounded view of the subject by practice in special proofs and original exercises. Prerequisites: Courses 3, 4, or equivalent.

Equivalent to Math. and Mech. 10, in the College of Engineering and Architecture.

Twenty-four lessons (one-half entrance unit). Asst. Prof. Edwards. \$15.00.

Note.—Courses 2 and 5 satisfy the requirements of the School of Mines and Metallurgy course, Mine Plant 1.

#### COLLEGE COURSES

- \*6. Higher Algebra, Part I. Brief review of Courses 1 and 2, linear equations in one, two, and three unknowns, with solution by determinants, ratio and proportion, variation, quadratic equations in one and two unknowns, graphs, completion of quadratic equations, progressions, equations in quadratic form, binomial theorem. Prerequisite: Courses 1 and 2, or equivalent.

Twenty-seven lessons (five credits). Assoc. Prof. Teeter. \$17.00.

Note.—Courses 5 and 6 meet the extra high school requirements in mathematics of the College of Engineering and Architecture.

7. Higher Algebra, Part II. A continuation of Part I, including a study of variations, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of functions, logarithms, theory of equations, solution of numerical higher equations, mathematical induction, combinations, permutations, probability, determinants (of orders above 3) and their applications.

Equivalent to Mathematics and Mechanics 11, in the College of Engineering and Architecture. (See Note A.)

Twenty-seven lessons (five credits). Assoc. Prof. Teeter. \$17.00.

Note.—Courses 6 and 7 satisfy the requirements of the School of Mines and Metallurgy course, Mine Plant 2 and 3.

8. Trigonometry. A course in plane and spherical trigonometry, designed to meet the needs of beginners and to include the subject usually considered in the ordinary college course. The solution of triangles is

\* May be taken for one-half entrance unit.

treated quite fully but not to the exclusion of analytical trigonometry. Prerequisite: Course 6 and logarithms. (Students who did not have logarithms in higher algebra may secure special lessons in this subject.)

Twenty-seven lessons (five credits). Assoc. Prof. Teeter. \$17.00.

Equivalent to Mathematics and Mechanics 12, in the College of Engineering and Architecture. (See Note A.)

Note.—Course 8 satisfies the requirement of the School of Mines and Metallurgy course, Mine Plant 4.

9. **Plane and Solid Analytical Geometry.** This course treats systems of co-ordinates, loci, the type forms of the equation of the straight line with application; the circle, central and general conic sections, tangents, diameters, asymptotes, some higher plane curves, parametric loci, polar curves, elements of solid analytic geometry. The fundamental problem of the equation and its locus forms the basis of the course. Prerequisite: Courses 7 and 8.

Thirty-two lessons (six credits). Assoc. Prof. Teeter. \$20.00.

Equivalent to Mathematics and Mechanics 13, in the College of Engineering and Architecture. (See Note A.)

NOTE.—Course 9 satisfies the requirement of the School of Mines and Metallurgy course, Mine Plant 5.

**Descriptive Geometry.** See Engineering 24.

10. **Differential Calculus.** A first course in differential calculus treating differentiation of algebraic and transcendental functions with attention to the notion of the limit of a function, continuity of a function, and the derivative. Extensive practice in the technique of differentiation by means of exercises and applications to maxima and minima, tangents, normals, curvature, singular points, velocity, and acceleration. Elementary discussion of Rolle's theorem and the law of the mean, indeterminate forms, and partial differentiation. The course is based upon a textbook with supplementary written lectures and exercises upon many of the topics. Prerequisites: Courses 7, 8, and 9.

Equivalent to Mathematics and Mechanics 24, in the College of Engineering and Architecture. (See Note A.)

Twenty-seven lessons (five credits). Asst. Prof. Edwards. \$17.00.

11. **Integral Calculus.** First course in integral calculus. The integration of various types of functions, the definite integral with applications to areas, surfaces, and volumes of geometric figures, rectification of curves and simple problems of mechanics. Much practice in the technique of integration and the use of tables of integrals, the evaluation of simple double and triple integrals. Prerequisite: Differential Calculus.

Equivalent to Mathematics and Mechanics, 25, in the College of Engineering and Architecture. (See Note A.)

Twenty-seven lessons (five credits). Asst. Prof. Edwards. \$17.00.

Note.—Courses 10 and 11 satisfy the requirements of the School of Mines and Metallurgy courses, Mine Plant 6, 7, and 8.



12. Differential Equations. A study of the elementary differential equations with emphasis on applications to geometry, elementary mechanics, physics, and engineering.

Twenty-seven lessons (five credits). Assoc. Prof. Teeter. \$17.00.

13. Theory of Equations. (For credit only with special permission.)

Sixteen lessons (three credits.) Asst. Prof. Edwards. \$10.00.

NOTE A.—Credit for courses in Mathematics in the College of Engineering and Architecture and the School of Chemistry on the basis of extension courses may be obtained by passing special comprehensive examinations.

### MUSIC

1. Harmony, First Quarter. Sixteen lessons (three credits). Miss Malcolm. \$10.00.
2. Harmony, Second Quarter. Sixteen lessons (three credits). Miss Malcolm. \$10.00.
3. Harmony, Third Quarter. Sixteen lessons (three credits). Miss Malcolm. \$10.00.

These courses offer the work of one year of harmony, as given at the University of Minnesota for resident students in the Department of Music. Consists of the study of scales, intervals, chords and their structure, inversion and progression, modulation, suspension, written exercises on given basses, harmonization of melodies, etc.

No credit for any quarter is given by the Department of Music until all three quarters have been successfully completed; but any quarter may be done by correspondence to supplement work done in residence.

Registration accepted only upon approval of previous preparation in music, which must be fully stated in the application.

51. 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 of parts, substitution for missing parts. Reading and writing of scores and individual parts. All with reference particularly to the small orchestra and to school organization. Prerequisite, Music 1, 2, 3 (Harmony) or its equivalent.

Part 1, 11 lessons (two credits). Miss Malcolm.

Part 2, 11 lessons (two credits). Miss Malcolm.

Part 3, 11 lessons (two credits). Miss Malcolm.

The fee for each part is \$7.00; all 3 parts may be had for \$20.00, when registration is made for the complete course.

NOTE.—This course is the equivalent of Instrumentation (Mu.Ed. 51-52-53) given in residence, each part covering one quarter's work.

## PHYSICS

## PREPARATORY COURSES

Note.—These preparatory courses in physics are without laboratory work; hence carry no entrance credit. They do, however, prepare a student to pass the state teacher's examination in physics for a first grade certificate.

1. Elementary Physics A. Weights and measures, simple machines, mechanics of liquids, mechanics of gases, non-parallel forces, elasticity and strength of materials, accelerated motion, force and acceleration, energy and momentum, heat—expansion and transmission—water, ice, and steam, heat engines.

Sixteen lessons (no credits). Assoc. Prof. Teeter. \$10.00.

2. Elementary Physics B. Magnetism, the elements of electricity, battery currents, measuring electricity, induced currents, electric power, alternating current machines; sound; lamps and reflectors, lenses and optical instruments, spectra and color, electric waves, Roentgen rays.

Sixteen lessons (no credits). Assoc. Prof. Teeter. \$10.00.

## COLLEGE COURSES

NOTE.—Courses in physics may be taken for credit toward a degree only when they are to be counted as purely elective. They are 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 college physics are subject to approval by the Department of Physics.

1. Elements of Mechanics and Sound. An elementary university course in the fundamental principles of mechanics and sound. Theoretical course without laboratory work. Prerequisites, Trigonometry and one year of high school physics.

Equivalent to Physics 3 offered in residence.

Sixteen lessons (three credits). Asst. Prof. Edwards. \$10.00.

2. Heat. An elementary university course in the general principles of heat, without laboratory work. Prerequisite: Course 1.

Equivalent to Physics 23 offered in residence.

Sixteen lessons (three credits). Asst. Prof. Edwards. \$10.00.

3. Optics. An elementary university course in the fundamental principles of light. Prerequisite: Course 1.

Equivalent to Physics 33 offered in residence.

Sixteen lessons (three credits). Asst. Prof. Edwards. \$10.00.

4. Magnetism and Electricity. An elementary university course in the principles underlying electrical and magnetic phenomena. Prerequisite: Course 1.

Equivalent to Physics 43 offered in residence.

Sixteen lessons (three credits). Asst. Prof. Edwards. \$10.00.

## POLITICAL SCIENCE

1. American Government. An elementary course in American government and politics intended as a preparation for teaching in secondary schools and for good citizenship. The course deals with the national government, treating its nature and origin. Special attention will be given to the organization of the executive, legislative, and judicial branches of the government, together with the various powers and duties of each department; to the conduct of foreign affairs; and to the present problems of national government.

Twenty-seven lessons (five credits). Asst. Prof. Saunders. \$17.00.

2. State Government. Essential features of early state governments; the purpose and theory of the federal system; constitutional basis for state authority and limitations; the state constitution; the legislature and legislation; the governor; the courts; administrative organization and activities; finance, taxation, sources of revenue, and the budget; the civil service; the electorate and elections; expression of public opinion; the relation of the state to its subdivisions; special problems. Prerequisite for credit, Course 1.

Twenty-seven lessons (five credits). Assoc. Prof. Field. \$17.00.

3. 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. Some study is made of the German Empire, the Russian Empire, and Italy before the Fascist régime. 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). Dr. Starr. \$17.00.

- II. Municipal Government. The organization, work, and problems of city governments. The relation of the city to the state and national governments. The legal basis of city government—the city charter. Home rule. Mayor-council, commission, and city manager plans of organization. The organization and powers of the council. Ordinance making. Nomination and election of officials. Civil service. Initiative, referendum and recall. Budgets, revenues, and expenditures, and debt. Prerequisite for credit, Course 1.

Twenty-seven lessons (five credits). Dr. Starr. \$17.00.

- IIa. Municipal Government—Short Course. An abbreviation of the course above, covering its essential features, the problems of city government with particular reference to Minnesota. It is designed primarily for public officials and persons interested in civic problems.

Sixteen lessons (no credit). Dr. Starr.

25. World Politics, 1878-1929. The foreign policy of the principal European and Asiatic powers since the Congress of Berlin. The principal emphasis is laid upon the period since 1918, altho a brief account is given of the pre-war period, each nation being studied separately. Prerequisites for credit: Course 1 or History 1-2 or 2-3.

Twenty-seven lessons (five credits). Asst. Prof. Mills. \$17.00.

Registrations will be accepted after November 1, 1929.

- 51-52-53. Business Law, see pages 21-22.

175. American Parties and Politics. A course dealing with the nature, functions, organization, and methods of political parties and public opinion as factors in representative government. The lessons cover the methods of nominating public officers, the conduct of election campaigns, the law of elections, the operation of political parties in the actual control of government. Careful study is made of a number of specific problems of democracy including the direct primary, corrupt practices, boss rule, the spoils system and the civil service, the initiative, referendum and recall, and the short ballot.

Sixteen lessons (three credits). Asst. Prof. Saunders. \$10.00.

181. International Law. A survey of the generally accepted principles of international law. The lessons cover the relations between sovereign states during both peace and war. Attention is paid to the chief problems of the law including those arising out of the World War. Specific problems are treated by case work. Prerequisite for credit: Course 1.

Twenty-seven lessons (five credits). Prof. Quigley. \$17.00.

## 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). Mr. Erickson. \$10.00.

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). Mr. Erickson. \$10.00.

3. Psychology Applied to Daily Life. This course aims to equip the student with a knowledge of the various techniques which psychology has found to be effective in influencing human behavior. Many applications of these techniques to different life situations are cited in order that the students may come to see them as usable in a wide range of human experiences. The personnel manager in business, the salesperson, the professional man, the parent, and the teacher will find these principles permeating their respective fields, and will find their appreciation for these principles increasing upon seeing them also applied to these other fields.

As a basis for understanding laws governing human behavior,

certain facts relative to the human mechanism and also methods of investigation are discussed. Prerequisites: General Psychology I and II.

Sixteen lessons (three credits). Asst. Prof. White. \$10.00.

Registrations will be accepted after September 1, 1929.

4. **Personnel Psychology.** 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. Prerequisites for credit: Psychology 1 and 2, and Personnel Administration 1 and 2.

Equivalent to Psychology 160f in the College of Science, Literature, and the Arts.

Sixteen lessons (three credits). Mr. Williamson. \$10.00.

#### EDUCATIONAL PSYCHOLOGY

(See Education 1)

#### PREVENTIVE MEDICINE AND PUBLIC HEALTH

52. **Health Care of the Family.** The purpose of the course is twofold: (1) To outline the general and specific measures to prevent illness, and (2) To give practical instruction in the care of the sick person in the home. The subject-matter includes a discussion of the general measures to increase resistance to disease, the symptoms and care of contagious diseases in the home, the care of the expectant mother and young baby, and the care of older children. In addition to the theoretical part of each lesson, practice exercises in home nursing are given which the student is expected to perform. Prerequisites for credit: General Bacteriology and Human Physiology.

Sixteen lessons (three credits). Asst. Prof. Boynton. \$10.00.

53. **Elements of Preventive Medicine.** Susceptibility, resistance, and immunity to disease: methods of spread and prevention of communicable and degenerative diseases; protection of food, water, and milk; school health work; vital statistics. Prerequisites for credit: General Psychology I and II; General Bacteriology or equivalent.

Sixteen lessons (three credits). Assoc. Prof. Diehl. \$10.00.

#### ROMANCE LANGUAGES

##### FRENCH

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before the final examination may be taken.

- \*1. **Beginning French I.** French grammar and reader; modern texts.

Twenty-seven lessons (five credits). Asst. Prof. Frelin. \$17.00.

- \*2. **Beginning French II.** A continuation of Course 1, which is prerequisite to it.

Twenty-seven lessons (five credits). Asst. Prof. Frelin. \$17.00.

\* May be taken for one-half entrance unit.

- \*3. Intermediate French I. Review of grammar; composition, reading of representative authors. Prerequisite: Courses 1 and 2 or equivalent.  
Twenty-seven lessons (five credits). Asst. Prof. Frelin. \$17.00.
- \*4. Intermediate French II. A continuation of Course 3. Prerequisite: Course 3.  
Twenty-seven lessons (five credits). Asst. Prof. Frelin. \$17.00.
8. Scientific French I. Readings from general works on scientific subjects. Particularly valuable to pre-medical students and others who expect to take up courses in science. Prerequisite: Courses 1, 2, and 3.  
Sixteen lessons (three credits). Asst. Prof. Frelin. \$10.00.
9. Scientific French II. A continuation of Course 8.  
Sixteen lessons (three credits). Asst. Prof. Frelin. \$10.00.
10. Scientific French III. A continuation of Course 9.  
Sixteen lessons (three credits). Asst. Prof. Frelin. \$10.00.
53. Elementary French Composition. This course is designed to train the student in the use of French. It presupposes a knowledge of intermediate French. It consists of translations of passages of connected prose dealing with everyday life in France, such as traveling, shopping, going to the theater, etc. Towards the end of the course, the student is expected to translate short clippings from newspapers. Prerequisite: Courses 1, 2, 3, and 4.  
Sixteen lessons (three credits). Asst. Prof. Frelin. \$10.00.
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). Asst. Prof. Frelin. \$10.00.

## 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). Asst. Prof. Clepton. \$17.00.
- \*2. Beginning Spanish II. A continuation of Course 1.  
Twenty-seven lessons (five credits). Asst. Prof. Clepton. \$17.00.
- \*3. Intermediate Spanish I. Review of grammar; composition, reading of modern Spanish texts. Prerequisite: Courses 1 and 2 or equivalent.  
Twenty-seven lessons (five credits). Asst. Prof. Clepton. \$17.00.
- \*4. Intermediate Spanish II. A continuation of Course 3. Prerequisite: Courses 1, 2, and 3.  
Twenty-seven lessons (five credits). Asst. Prof. Clepton. \$17.00.
53. Elementary Spanish Composition. Connected prose composition dealing with everyday life in Spain. The aim is the ability to write Spanish. Prerequisite Courses 1, 2, 3, and 4 or equivalent.  
Sixteen lessons (three credits). Assoc. Prof. Arjona. \$10.00.
63. Advanced Spanish Composition. A continuation of Course 53, which is prerequisite.  
Sixteen lessons (three credits). Assoc. Prof. Arjona. \$10.00.

\* May be taken for one-half entrance unit.

## SCANDINAVIAN

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before the final examination may be taken.

## NORWEGIAN

- \*1. Beginning Norwegian I. Elementary study of the language: grammar, composition, select readings in easy prose and poetry.  
Twenty lessons (four credits). Prof. Bothne. \$13.50.
- \*2. Beginning Norwegian II. A continuation of Course I, which is prerequisite.  
Twenty lessons (four credits). Prof. Bothne. \$13.50.
- \*3. Intermediate Norwegian I. Grammar; composition; elementary history of literature; select works of modern authors. Prerequisite: Courses I and 2 or equivalent.  
Twenty lessons (four credits). Prof. Bothne. \$13.50.
- \*4. Intermediate Norwegian II. A continuation of Course 3.  
Twenty lessons (four credits). Prof. Bothne. \$13.50.
- 5. Advanced Norwegian I. The reading of representative prose and poetry. Prerequisite: Courses 1, 2, 3, and 4 or equivalent.  
Twenty-seven lessons (five credits). Prof. Bothne. \$17.00.
- 6. Advanced Norwegian II. A survey of Norwegian literature.  
Twenty-seven lessons (five credits). Prof. Bothne. \$17.00.

## SWEDISH

- \*1. Beginning Swedish I. Grammar and composition; select readings in easy prose and verse.  
Twenty lessons (four credits). Prof. Stomberg. \$13.50.
- \*2. Beginning Swedish II. A continuation of Course I, which is prerequisite.  
Twenty lessons (four credits). Prof. Stomberg. \$13.50.
- \*3. Intermediate Swedish I. Grammar; composition; easy reading. Prerequisite: Courses 1 and 2.  
Twenty lessons (four credits). Prof. Stomberg. \$13.50.
- \*4. Intermediate Swedish II. A continuation of Course 3.  
Twenty lessons (four credits). Prof. Stomberg. \$13.50.
- 107. Swedish Literature I. History of Swedish literature from 1718 to the present time. History of the literature, and study of modern authors, including Selma Lagerlöf, Gerierstam, Strindberg. Prerequisite: Courses 1, 2, 3, 4, and advanced Swedish or equivalent.  
Sixteen lessons (three credits). Prof. Stomberg. \$10.00.
- 108. Swedish Literature II. A continuation of Course 107. Open to advanced students.  
Sixteen lessons (three credits). Prof. Stomberg. \$10.00.
- 109. Swedish Literature III. A continuation of Course 108.  
Sixteen lessons (three credits). Prof. Stomberg. \$10.00.

\* May be taken for one-half entrance unit.

## SOCIAL SCIENCE

## PREPARATORY COURSE

1. Social Science A. This is a course whose primary 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. Since present institutions are the outgrowth of past experience, the first few lessons will be spent in an historical survey of man's progress up through the industrial revolution. The remaining portion of Part A is devoted to a study of the 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). Asst. Prof. Lundquist.  
\$12.50.

2. Social Science B. Community Life and Civic Problems. The course aims to give an insight into governmental activities as they affect the life of individuals in everyday contacts. Group life and community problems are first analyzed. A brief survey of industrial society follows, where especial attention is given to work and the worker, exchange, transportation, labor, and capital. Students are finally asked to study the machinery of government as a controlling factor in the township, village, municipality, county, state, and nation, with which political parties and the ballot are concerned. 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). Asst. Prof. Lundquist.  
\$12.50.

## SOCIOLOGY

1. Introduction to Sociology. A study of the evolution and present organization of human society. The evolution of typical social institutions, such as the family, industry, and the state; the influence of the biological and environmental (both physical and social) factors upon man in his social relationships; an introductory analysis of some of the leading social problems of the time; a study of the methods of social organization and control, especially from the standpoints of tradition, custom, and science. This course is intended to serve (1) as an introduction to other more specialized courses in sociology, (2) as a background for a better understanding of the society in which we live and of its problems.

Twenty-seven lessons (five credits). Asst. Prof. Lundquist. \$17.00.

3. Principles of Social Work. A study of the historical background and development of social work from the Middle Ages down to the present century, with special reference to the contributions made by church



and state. Special emphasis is placed on housing reform, the settlement movement, the child welfare movement, and the function of case work in relation to schools, hospitals, and the general field of industry. Attention is focused on the professional aspects of the field of social work. Prerequisite: Course 1.

Sixteen lessons (three credits). Mrs. Doyle. \$10.00.

14. Rural Sociology. A study of the conditions and problems of country life. Analysis of environmental, human, and general social conditions; how soil, climate, etc., the quantity and quality of the rural population, the interaction of city and county determine the type of rural communities. Problems of sanitation, co-operation, education, religion, recreation, crime, and dependency growing out of these conditions. This course has been thoroly revised.

Twenty-seven lessons (five credits). Asst. Prof. Lundquist. \$17.00.

49. The Occurrence of the Socially Inadequate. A study of inadequacy of individuals to meet a modern complex environment together with a discussion of methods used in their care and treatment. Special consideration will be given to such problems as the handicaps of poverty, delinquency, mental and physical incapacity, old age, and broken homes. Prerequisites: 10 credits in sociology or Sociology 1 and 10 credits in social sciences or psychology.

Sixteen lessons (three credits). Mrs. Fenlason. \$10.00.

50. Field Work in Rural Sociology. Students who have completed the work in Rural Sociology (Sociology 14) or its equivalent may, with the consent of the instructor, enroll for more advanced work on some selected rural community problem. The work will consist of the application of the survey method to the study of the problem selected. Schedules will be provided through the Correspondence Department. The student will collect the data and will be responsible for some preliminary interpretation of this data. The accuracy of the completed schedules, which will be returned to the instructor, and the ability shown in interpreting the data collected will serve as a basis for judging the quality of the work done. One, two, or three hours' credits, according to amount of work done. Asst. Prof. Lundquist. \$5.00.

52. Elementary Case Work. A study of the methods of investigation, diagnosis and treatment by which individuals are helped to adjust themselves to their surroundings. Prerequisite: Course 49.

Sixteen lessons (three credits). Miss Salsberry. \$10.00.

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. Health, education, recreation, protection from industrial exploitation, and legal protection through courts, and the probation system are considered for the various periods of childhood. The contributions made by public and private societies and institutions are definitely outlined. Prerequisite: Course 1 or its equivalent.

Sixteen lessons (three credits). Mrs. Doyle. \$10.00.

101. Social Organization. A study of the foundations of democracy, including the organization and structure of groups, the development of social ideals, the factors producing disorganization and reorganization of institutions, and the methods of promoting an intelligent and lasting democracy. Prerequisite: Course 1 or equivalent.

Sixteen lessons (three credits). Asst. Prof. Lundquist. \$10.00.

110. Rural Community Organization. This course is intended for those working in the rural community and small towns and 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). Asst. Prof. Lundquist. \$10.00.

119. The Family. The evolution of the family; its various forms and their relation to other social institutions; the rôle of the family in social evolution; contemporary problems of the family. Prerequisite: four courses in sociology or the equivalent.

Sixteen lessons (three credits). Asst. Prof. Lundquist. \$10.00.

120. Social Progress. 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 or in residence.

Sixteen lessons (three credits). Asst. Prof. Lundquist. \$10.00.

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# *The Bulletin of the University of Minnesota*

## *The Summer Session Announcement of Courses 1929*

First Term June 18 to July 27  
Second Term July 29 to August 31



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Act of October 3, 1917, authorized July 12, 1918*

1929							1930													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	1	2	3	4	5	6	..	..	..	1	2	3	4	..	..	1	2	3	4	5
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26
28	29	30	31	..	..	..	26	27	28	29	30	31	..	27	28	29	30	31	..	..
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4	5	6	7	8	9	10	2	3	4	5	6	7	8	3	4	5	6	7	8	9
11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16
18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23
25	26	27	28	29	30	31	23	24	25	26	27	28	..	24	25	26	27	28	29	30
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<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
1	2	3	4	5	6	7	..	..	..	..	..	..	1	..	1	2	3	4	5	6
8	9	10	11	12	13	14	2	3	4	5	6	7	8	7	8	9	10	11	12	13
15	16	17	18	19	20	21	9	10	11	12	13	14	15	14	15	16	17	18	19	20
22	23	24	25	26	27	28	16	17	18	19	20	21	22	21	22	23	24	25	26	27
29	30	..	..	..	..	..	23	24	25	26	27	28	29	28	29	30	..	..	..	..
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6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
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3	4	5	6	7	8	9	4	5	6	7	8	9	10	2	3	4	5	6	7	8
10	11	12	13	14	15	16	11	12	13	14	15	16	17	9	10	11	12	13	14	15
17	18	19	20	21	22	23	18	19	20	21	22	23	24	16	17	18	19	20	21	22
24	25	26	27	28	29	30	25	26	27	28	29	30	31	23	24	25	26	27	28	29
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<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
1	2	3	4	5	6	7	1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	31	..	..	..	..	29	30	..	..	..	..	..	28	29	30	31	..	..	..
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## CALENDAR

### SUMMER SESSION 1929

June	18-19	Tues.-Wed.	Registration, first term
June	20	Thursday	First term classes begin
July	4	Thursday	Independence Day; a holiday
July	27	Saturday	First term closes Registration for second term closes
July	29	Monday	Second term classes begin
August	31	Saturday	Second term closes

## BOARD OF REGENTS

The Hon. Fred B. Snyder, Minneapolis, President of the Board  
 Lotus Delta Coffman, Minneapolis - - - - - *Ex officio*  
 The President of the University  
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Harlow C. Richardson, B.A., Associate Director of the Summer Session  
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Frank K. Walter, M.A., M.L.S., University Librarian  
Rodney M. West, B.A., Registrar  
Walter R. Smith, B.A., Director of Intramural Athletics, in charge of  
Physical Recreation

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Wilson D. Wallis, Ph.D., Professor

#### ASTRONOMY

William O. Beal, Ph.D., Assistant Professor

#### BOTANY

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George O. Burr, Ph.D., Assistant Professor  
Ethel Mygrant, M.S., Instructor  
Henry Oosting, M.S., Instructor  
Abraham Stoesz, B.A., Instructor  
Helen Foot, B.A., Assistant

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#### ENGLISH

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Martin B. Ruud, Ph.D., Professor  
Frederick Klaeber, Ph.D., Litt.D., Professor of Comparative Philology  
John N. D. Bush, Ph.D., Associate Professor  
Mary Ellen Chase, Ph.D., Associate Professor, Smith College  
Elizabeth Atkins, Ph.D., Assistant Professor  
L. Burton Hessler, Ph.D., Assistant Professor  
Elizabeth Jackson, Ph.D., Assistant Professor  
G. Tremaine McDowell, Ph.D., Assistant Professor  
Charles W. Nichols, Ph.D., Assistant Professor

FACULTY

7

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Amy Armstrong, M.A., Instructor  
Harold Briggs, M.A., Instructor  
Ruth Christie, M.A., Instructor  
John J. Creamer, B.A., LL.B., Instructor  
Frances K. del Plaine, M.A., Instructor  
Margaret Gable, M.A., Instructor  
Adah G. Grandy, B.L., Instructor  
Malcolm S. MacLean, B.A., Instructor

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Frank E. Williams, Ph.D., Assistant Professor, University of Pennsylvania  
Ethel V. Nelson, B.S., Assistant

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James Davies, Ph.D., Assistant Professor  
George F. Lussky, Ph.D., Assistant Professor  
Karl Ermisch, Ph.D., Instructor

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Lester B. Shippee, Ph.D., Professor  
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Robert V. Cram, Ph.D., Assistant Professor  
Faith Thompson, Ph.D., Assistant Professor  
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Gilbert N. Tucker, M.A., Instructor  
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Lura C. Hutchinson, B.A., Assistant Professor  
Rae Stockham, Ph.B., Assistant Professor

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 Dunham Jackson, Ph.D., Professor  
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 Elizabeth Carlson, Ph.D., Assistant Professor  
 James V. Uspensky, Ph.D., Professorial Lecturer, University of St. Petersburg  
 Paul G. Hoel, B.A., Assistant  
 Borghild Gunstad, B.A., Assistant  
 Myron Rosskopf, B.A., Assistant

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 Donald N. Ferguson, M.A., Professor  
 Earle Killeen, M.M., Professor  
 William Lindsay, Associate Professor  
 George H. Fairclough, F.A.G.O., M.Mus., Assistant Professor  
 Abe Pepinsky, Assistant Professor  
 Blanche Kendall, Instructor  
 Karl Scheurer, Instructor  
 Agnes R. Snyder, Instructor

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 George P. Conger, Ph.D., Associate Professor

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 Anthony Zeleny, Ph.D., Professor  
 Louallen F. Miller, Ph.D., Associate Professor  
 Joseph Valasek, Ph.D., Associate Professor  
 J. William Buchta, Ph.D., Assistant Professor

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 Morris B. Lambie, Ph.D., Professor  
 Harold S. Quigley, Ph.D., Professor  
 Jeremiah S. Young, Ph.D., Professor  
 Oliver P. Field, M.A., S.J.D., Associate Professor  
 Allan F. Saunders, Ph.D., Assistant Professor  
 Joseph R. Starr, M.A., Instructor

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 Edna Heidbreder, Ph.D., Associate Professor  
 William T. Heron, Ph.D., Assistant Professor  
 Kate Hevner, Ph.D., Assistant Professor  
 Walter G. McAllister, B.A., Instructor  
 Harold Carter, B.A., Assistant

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 Irville C. Le Compte, Ph.D., Professor  
 Francis B. Barton, Docteur de l'Université de Paris, Associate Professor  
 Edward H. Sirich, Ph.D., Associate Professor  
 Marguerite Guinotte, M.A., Instructor

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 Pitirim Sorokin, Dr. of Soc., Professor  
 Wilson D. Wallis, Ph.D., Professor  
 Robert W. Murchie, Ph.D., Associate Professor  
 Malcolm M. Willey, Ph.D., Associate Professor  
 Gustave A. Lundquist, Ph.D., Assistant Professor  
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 Anne L. Fenlason, M.A., Instructor  
 Fred Frey, M.A., Instructor  
 Frank Harris, M.A., Instructor  
 Paul H. Landis, M.A., Instructor  
 Elio D. Monachesi, M.A., Instructor  
 George B. Vold, M.A., Instructor

## SPEECH

Frank M. Rarig, M.A., Professor  
 Joseph F. Smith, M.A., Associate Professor, University of Utah  
 Bryng Bryngelson, M.A., Assistant Professor  
 Wayne Morse, M.A., Assistant Professor  
 F. Lincoln D. Holmes, M.A., Instructor  
 Franklin Knower, M.A., Instructor  
 Edward Staadt, B.A., Instructor  
 Verna Steel, B.A., Teaching Assistant

## ZOOLOGY

Edward P. Churchill, Ph.D., Professor, University of South Dakota  
 Jerry E. Wodsedalek, Ph.D., Professor  
 Ralph T. King, M.A., Assistant Professor  
 Adolph R. Ringoen, Ph.D., Assistant Professor  
 John A. Cederstrom, Ph.B., Instructor  
 Fannie Harmon, M.A., Teaching Assistant

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## DRAWING AND DESCRIPTIVE GEOMETRY

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Henry C. T. Eggers, E.E., Assistant Professor

Robert F. Schuck, B.S. (E.E.), Assistant Professor

## MATHEMATICS AND MECHANICS

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Carl A. Herrick, M.E., Associate Professor

George C. Priester, Ph.D., Associate Professor

Hugh B. Wilcox, M.S. (E.E.), Associate Professor

Charles Boehnlein, B.S., M.E., Assistant Professor

Forrest E. Miller, B.S. (Agr. Eng.), Instructor

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Dayton A. Rogers, Instructor

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### FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

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Albert G. Black, Ph.D., Assistant Professor  
Rex W. Cox, M.S., Assistant Professor  
Lewis F. Garey, M.S., Assistant Professor

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Vetta Goldstein, Instructor  
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 Wallace H. Cole, M.D., F.A.C.S., Assistant Professor  
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 Katherine E. Dougherty, R.N., Assistant Professor  
 Dorothy Kurtzman, R.N., Assistant Professor  
 Olena Ordahl, R.N., Assistant Professor  
 Esther Andreasen, R.N., Instructor  
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 Harry Hillstrom, B.S., M.D., Teaching Fellow  
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Burrell F. Ruth, M.S., Instructor in Chemical Engineering

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Elsie Ober, B.S., Instructor

Hilma Berglund, Instructor

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 Educational Sociology, University of Oregon, Eugene, Ore.  
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 apolis Public Schools

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 F. Roels, University of Utrecht, Utrecht, Holland  
 Wolfgang Koehler, University of Berlin  
 F. Aveling, University of London, Kings College  
 L. Wynn-Jones, University of Leeds, Leeds, England  
 R. H. Thouless, Psychological Laboratory, University, Glasgow

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 Walter Ray Smith, B.A., Instructor  
 Niels Thorpe, Instructor

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 Katherine Hersey, B.S., Instructor  
 Winona Jones, B.A., Instructor  
 Helen Starr, B.S., Instructor  
 Florence Tenney, B.S., Instructor, Madison High School, Madison, Wis.  
 Florence Warnock, B.S., Instructor

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 Keith Elizabeth Headley, M.A., Teaching Assistant  
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## THE SUMMER SESSION

The Summer Session of the University of Minnesota is a regularly established division of the University. Its courses are designed (1) for graduate and undergraduate students who wish to reduce their period of residence at the University by accumulating credits during the summer; (2) for superintendents, principals, supervisors, teachers, and others of professional interests who desire further training in their professions; (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.

### SPECIAL INSTITUTES AND CONFERENCES

In addition to the offerings of the colleges giving courses in the 1929 Summer Session, the University will sponsor (1) a special series of lectures and demonstrations by artists of international prominence dealing with various phases of interest in the field of fine arts, (2) a conference on the problems of the small town, (3) a symposium headed by six of the world's recognized leaders in physiology and biochemistry, (4) a symposium on chemical kinetics directed by outstanding European, British, and American specialists in this field.

Each project is briefly described in the following paragraphs. Detailed announcements will be sent upon request. Please indicate the project in which you are interested.

### INSTRUCTION IN THE FINE ARTS

The growth of interest in the fine arts in recent years encourages further efforts to make the work of the artist available and intelligible to the greatest number of people. The artist seeks to interpret his time and the spirit of the people of his day. His interpretations he seeks to embody in forms which shall be understood by his fellows and shall be lasting for the benefit of later generations. The understanding of the work of the artist, however, depends upon the cultivation of the people who view it, upon their knowledge of psychology, history, and the principles of social organization. The habits, customs, employments, and economic conditions of a country and a period in which a work of art is produced must be understood in order to make the art work intelligible and appreciated. What seems most necessary at the present time is the study of the history of the fine arts, their significance in the development of civilization, and their place in human life.

For the coming summer, in addition to work for the training of artists in several fields, the University will offer work intended especially for those who seek to understand works of art. While detailed announcement of the program must be made later, it is expected that there will be lecture courses in the history of art, lectures and demonstrations by prominent artists, and specific practical instruction in one or more branches of art.

In addition to this special program attention is called to courses in other departments which will be of interest to those who wish to give their full time to this general field. These courses will be found in the announcements of the Departments of Architecture, Art Education, Comparative Literature, German, Greek, Related Art in Home Economics, Philosophy, Psychology, Romance Languages, Speech, and Sociology.

#### CONFERENCE ON PROBLEMS OF THE SMALL TOWN

(Cities and Villages of 6,000 Population and Less)

There will be a conference on Problems of the Small Town held at the University during the week beginning June 24. This conference will be of particular interest to city officials, social workers, business men, lawyers, doctors, workers in women's clubs and others who are interested in the community problems affecting the welfare of the small town. The conference will undertake a study of the various questions affecting the economic and social life of the small communities.

There are many pressing problems confronting communities which range in size from a few hundred up to six thousand. Some of these are of recent origin arising from changes which are apparently taking place in economic and industrial conditions. The development of good roads and the extensive use of the automobile, for example, are having a decided effect upon the small town as a trading center. Rural districts are not as dependent as they once were upon small towns located a few miles apart. It is as easy to travel fifty miles now as it formerly was to go ten. This brings the small towns into competition with the larger communities as well as with each other. Furthermore, the extension of chain stores and banking into the smaller communities as well as the extension of mass production in manufacturing are evidences of a trend in the integration of commerce and industry. The effect of these factors is already being felt on the life of the small town. It is the purpose of this conference to analyze these and other conditions which are affecting the economic and social welfare of the small communities.

The following topics will constitute the subject-matter for the conference:

1. *The future of the small town from an economic and commercial standpoint.*—Consideration will be given to the general industrial conditions affecting the Northwest. The problems of the small town merchant, particularly concerning his efforts to compete with the newer forms of merchandising such as chain stores and mail order houses will be considered. The possibilities for successfully operating certain types of factories in the small town in competition with the highly industrialized districts will be

discussed. The administration of country banks and the extension of the chain banking system will also be discussed.

2. *Town administration, finance, and taxation.*—Among the more important questions confronting the smaller communities are several concerned with the organization of the town; such, for example, as the advantages of incorporation as compared with non-corporation of cities or villages. Other problems related to the business of the small town as a political unit, making of annual budgets, problems in indebtedness, making of programs of expenditures over a period of years as well as questions pertaining to town planning, zoning, recreation, water supply, etc. will be considered.

3. *Sociological problems.*—Many of the sociological problems of the small town are closely associated with those included in the topics mentioned above. In addition to these may be considered such questions as the small town newspaper, child guidance, denominationalism and church consolidation, and education.

4. *Public health.*—Questions concerning the milk supply, sanitation, hospitalization and clinics, rural medicine, etc. will be discussed under this topic.

The conference will consist of three sessions each day. There will be round table discussions with those interested in the specific topics mentioned. In addition there will be lectures and open forum discussions of a more general character. Evening meetings will be given over to addresses by prominent speakers. It is hoped that the conference will be productive of suggestions which will be of significance to the small communities of the state. The results of the round table discussions and the addresses will be published. These will be available to those who attend the conference. A detailed description of the conference may be obtained by writing to the summer session office for a special bulletin.

#### SYMPOSIUM ON PHYSIOLOGY AND BIOCHEMISTRY

The period of the summer quarter from July 15 to August 15 will be devoted to a special program of physiology and biochemistry. Noted foreign professors in these lines have been invited to spend this period at the Medical School and Mayo Foundation. Acceptances have been received from Professor M. v. Frey, of the University of Wurzburg, celebrated in the field of sense physiology and Professor G. V. v. Anrep, of Cambridge, England, who is well known for his work on conditioned reflexes. Other acceptances are expected. It is hoped also that a number of American medical scientists will be in attendance.

The triennial International Physiological Congress is to be held in Boston, August 19-23. This is the first time this organization has met outside of Europe. Advantage is to be taken of this gathering to bring internationaly known scientists to Minnesota.

The program in outline will consist of series of lectures by each visiting professor on the particular subjects in which he has done outstanding research. There will be regular seminars for informal discussion. Each visitor will be given an office in which he may confer with those interested



in similar lines of investigation. It is also expected that the visitors will visit our laboratories and advise with our workers in regard to their own problems.

The symposium will be of interest to all biological workers, medical scientists, psychologists, and to many practitioners of medicine interested in fundamental questions.

The local committee consists of George Fahr, professor of medicine, Ross Gortner, professor of biochemistry at the University Farm, J. F. McClendon, professor of physiological chemistry in the Medical School, F. H. Scott, professor of physiology, and Dean E. P. Lyon.

#### SYMPOSIUM IN CHEMISTRY

In addition to the regular summer courses in the second half of the Summer Session of 1929 a series of special lectures and conferences will be devoted to two branches of chemistry, chemical kinetics and biochemistry, the progress in which is particularly rapid at the present time. The regular summer courses of instruction in these two subjects have been supplemented by inviting several European and American authorities to lecture, conduct research, lead conferences, and give special addresses on various phases of the two subjects.

##### *Chemical Kinetics*

The growing importance of this subject and its relations to catalysis; chemical activation by thermal, photochemical, and ionizing agents; chain mechanism; and inhibition made it appear desirable to bring together some of the leading authorities in this field not only to afford advanced students the opportunity of close contact with them but to stimulate the exchange of ideas and to promote research in this field. The courses are planned to embrace the various aspects of reaction velocity and mechanism.

##### *Biochemistry*

The breadth of the present interest in the chemistry of life processes is manifested in the co-operation of the Medical School and the College of Agriculture in joining the School of Chemistry to sponsor this symposium on the application of physical and organic chemistry to biochemistry. The courses have been arranged so that advanced students may elect any of them as a part of their regular summer session program.

The courses in both sections will be given so as to avoid conflict with each other, enabling those who desire to attend all.

A two-hour seminar in each of the two general subjects will be held each week. Students may receive two credits in any of the lecture courses, which may be elected singly or in any combination. An additional credit may be earned by attendance at either of the weekly seminars (or two credits for both).

INSTITUTE FOR TUBERCULOSIS AND  
PUBLIC HEALTH NURSES

June 17 to 29, 1929

A Regional Institute for Tuberculosis and Public Health Workers will be held at the University in Room 9 of Folwell Hall during the period June 17 to 29, 1929. The institute is conducted through the administrative agency of the General Extension Division of the University, under the auspices of the National Tuberculosis Association, the Minnesota Public Health Association, and the Hennepin County Tuberculosis Association. Class meetings will be held mornings and afternoons of every day during the period indicated. The institute has four main objectives: to assist workers already in executive positions in the tuberculosis field to assume positions of greater responsibility, or to be more useful in their present positions; to prepare for executive positions those who have not had experience in the tuberculosis field; to give to volunteer workers a more comprehensive knowledge of the administrative problems involved in this work; to aid in the standardization of methods and programs of tuberculosis work. Membership in the institute is by invitation only and limited to thirty members. Applications for the institute should be sent to Dr. E. A. Meyerding, Minnesota Public Health Association, 11 W. Summit Avenue, St. Paul, Minnesota. A registration fee of \$10 is the only charge for the institute course. Registration will take place at the office of the General Extension Division, Room 402 Administration Building, University of Minnesota. The registration fee is payable not later than the opening day.

## SPECIAL CLASSES FOR VISITING TEACHERS

Through an arrangement with the National Committee on Visiting Teachers, the College of Education is able to offer two special courses by Miss Gladys Hall. These courses are primarily intended for classroom teachers who are interested in studying the recently developed methods of utilizing the home and other extra-school relationships in the handling of difficult school problems.

Miss Hall is an experienced worker and will bring to her students much concrete material from this new profession. The seminar course will afford mature workers an opportunity to deal extensively with the technical methods of visiting teacher work.

## GENERAL INFORMATION

## LOCATION

The main campus of the University of Minnesota is located on the east bank of the Mississippi River in the city of Minneapolis. The summer courses, with the exception of those in agriculture and in home economics, are given on the Minneapolis campus. The university buildings, libraries, laboratories, observatory, and museums are at the service of the summer

students. In addition to the equipment of the University, there are a number of public and semipublic libraries in St. Paul and Minneapolis available for the students' use.

The courses in agriculture and home economics are given on the University Farm campus, one of the beautiful spots of the Twin Cities. The College of Agriculture has its own library, laboratories, museums, gymnasium, tennis courts, and grounds for other sports. It also offers the advantages of the main campus, for it is connected with the latter by an intercampus trolley line which gives a regular free thirty-minute service. The Como-Harriet interurban line between the two cities is only a short distance from the college campus, so that the libraries, art galleries, lecture courses, and recreational facilities in both cities are accessible.

#### DURATION OF THE SESSION

The Summer Session consists of two terms. The first term, of six weeks, begins Tuesday, June 18, and closes Saturday, July 27. The second term, of five weeks, begins Monday, July 29, and closes Saturday, August 31. First term classes begin on Thursday, June 20; second term classes, on Monday, July 29.

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. The student should secure the permission of the instructor at the beginning of the term, to avoid misunderstanding later, and then arrange with the registrar for the proper examination.

#### GENERAL OFFICES

The office of the director of the Summer Session is in Room 236 on the second floor of the Administration Building. 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.

#### DEGREES

Regular collegiate credit is given for summer session work to qualified students. For a detailed statement of the credit requirements for the various degrees, see the general information bulletin for 1928-29, pages

14-26; and the bulletins of the various schools and colleges of the University for the same year.

The University requires at least one year of residence for any degree; and if the term of residence is only one year, that must be the senior year. In any case two quarters of the senior year must be spent in residence. Work completed in the Summer Session is considered as residence credit.

#### CREDIT

Credit is administered on the following basis: One quarter credit requires in general 12 lecture or recitation periods (two per week for a summer term) requiring two hours of preparation each; or, 24 periods of laboratory work requiring one-half hour of preparation each; or 36 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 nine credits or two five-credit courses, is considered a full program for either term. Registration for a greater number requires special permission from the Students' Work Committee, 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 made before the end of the summer term.

#### RECREATION

Recreation is an essential part of any program of study, particularly during the summer months. The University of Minnesota makes a special effort to supply this essential in a very complete, and in some ways, unique manner. A recreational program is definitely planned, definitely directed, definitely supported. It is not left to chance, or the accident of student initiative (altho many matters, of course, may be left to student organization), but follows a well-prepared plan. The associate director of the Summer Session is in complete charge of all recreational activities, ar-

ranges their place on daily and weekly programs, and assumes responsibility for their being properly carried on. There is a definite provision for their financial support, so that practically all events are available to students without extra charge, or at most, with only nominal incidental expense.

The Twin Cities, Minneapolis and St. Paul, in themselves offer many attractions for the summer visitor. As centers of art, music, and education they are well known, and their libraries, museums, and other institutions are easily accessible. As a center of outdoor life they are becoming equally famous. There are several large lakes within their city limits, and the park systems contain numerous other small but attractive bits of water. They are, too, the gateway to the countless resorts on the 10,000 lakes of Minnesota. Many students find it desirable and convenient to spend week-ends at some of these resorts.

Some of the forms of recreation provided are enumerated in the paragraphs below:

*Lectures and convocations.*—Weekly convocations, addressed by speakers of prominence, are supplemented by a series of almost daily lectures. These are given by faculty members and by invited guests, and cover a large variety of subjects of literary, scientific, professional, historical, or popular interest.

*Concerts and recitals.*—Every week brings one or more occasions when students may withdraw to the concert hall of the Music Building and enjoy a musical program, or a lecture-recital on a musical or literary theme. These occasions are as much for the pure enjoyment of the moment as for the opportunity to enlarge one's acquaintance with masterpieces. They are free to students, and very popular.

*Dramatics.*—Performances of legitimate drama have become an outstanding feature of the Summer Session. The Masquers, 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 are provided.

*Socials.*—Gatherings of a purely social nature are frequent. These afford opportunity for the development of acquaintanceships among students and faculty members, and the comfortable fraternizing that has come to be a recognized element in summer session life. A regular series of these gatherings is definitely organized and directed, while many others result from student planning.

*Excursions.*—The many points of historical, industrial, artistic, or purely recreational interest around the Twin Cities are made the objectives of definitely organized and personally conducted excursions. These are arranged for the most advantageous hours, and it is a frequent event of a Saturday afternoon to see a party of perhaps two hundred set out from the campus for a highly enjoyable tour. The cost is usually only the necessary street car or bus fare.

*Physical activities.*—Espacial attention is given to the matter of physical recreation, entirely supplementary to the courses in physical education. The facilities and services offered are many and varied, and may be briefly summarized as follows: three gymnasiums, each with a swimming pool—

the main gymnasium for men, the women's gymnasium, the Farm gymnasium for students of agriculture and home economics; Northrop Field, for baseball, track, volley ball, diamond ball; thirty tennis courts open for daily use (these are regularly ruled and lined and provided with nets); instructors and attendants on duty at all times; tennis and golf tournaments; baseball teams in regular series of games; swimming at practically all hours of the day; prizes for winners in contests.

All of these facilities are available for both men and women and with no extra charge except for towel service.

*Tennis tickets.*—The use of the tennis courts is restricted to those holding tickets. Such tickets will be issued to regularly enrolled students of the Summer Session, without charge, upon application to the Athletic Department, University Armory, and presentation of the bursar's receipt for fees. Members of the university faculty and staff, and other non-students, may secure these tickets, good for one term, upon payment of one dollar.

*Members' tickets.*—Certain recreational events are open only to regular members of the Summer Session, and admission is by signed and numbered tickets. These tickets are issued, without charge, upon presentation of the bursar's receipt for fees. During registration days tickets will be issued at the registrar's office, on both campuses; at other times at the office of the director of the Summer Session, 236 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 ball-room, reception rooms, reading rooms, lounging rooms. These rooms and their facilities are open to all men students.

The 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 does 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. The University Farm post-office is in the Administration Building. 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 session, students should give the postmaster a forwarding address.

#### OFFICIAL DAILY BULLETIN

Throughout the year an official daily bulletin is issued, in the *Minnesota Daily*, containing announcements to students and faculty. During the sum-

mer this is published as a separate sheet. In addition to the announcements 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 early each morning except Monday. Each student is held responsible for the official notices appearing in the bulletin.

#### STUDENTS' HEALTH SERVICE

The Students' Health Service conducts a dispensary during the Summer Session on the same basis as during the regular school year, the same staff of physicians, dentists, and nurses being on duty. This dispensary maintains, exclusively for students, clinics in medicine, surgery, dermatology, ophthalmology, oto-laryngology, and dentistry. Hospitalization, whenever necessary for students, is provided in the "private patient" section of the University Hospital. 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 at 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. For a few years the University has made an examination service available to students during the Summer Session and each year a larger number of students have taken advantage of this service. No extra charge is made for this service.

For surgical operations, special drugs, 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.

#### THE INTERCAMPUS CAR

For students who are registered for class work on both the Minneapolis campus and the University Farm campus, free transportation on the inter-campus 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 Service Department, 11 Administration Building.

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 service department.

#### SUMMER EMPLOYMENT

Students are not advised 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. There is considerable demand for services during the summer at good rates of remuneration, and many students are aided in this way. The bureau is on the basement floor of the Administration Building.

#### TEACHERS' EXAMINATIONS

Examinations for state teacher's certificates will be conducted by the State Department of Education at the University during the Summer Session.

#### THE UNIVERSITY LIBRARY

The University Library is open to all students of the Summer Session. It includes about 425,000 volumes and many periodicals and pamphlets on all subjects in the university curriculum.

The largest part of the library is housed in the Library Building on the Minneapolis campus. This is among the latest 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.

*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.

#### 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 and board may be had from \$9 to \$12 per week. 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 Mrs. Catherine McBeath, 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.*

#### SANFORD HALL

Sanford Hall, a residence hall for women, is on the Minneapolis campus. It accommodates 228 students. The building has every modern convenience. All rooms have hot and cold water, and each double room has two closets.

The furniture consists of a cot, dresser, a study table, easy chair, straight chair, and rug for each student. All bedding and the laundry for the same is furnished.

The rates during the Summer Session are as follows, payable at the time of registration:



*SUMMER SESSION*

Board and room when occupying a single room, \$60 for the first term.

Board and room when sharing a double room, \$50 for the first term.

Because of the excessive demand for accommodations at Sanford Hall reservations should be made as far in advance as possible. Applications should be sent direct to Sanford Hall, University of Minnesota. No application will be recorded until a deposit fee of \$2 is received. This deposit will hold the room until the day after the opening of the Summer Session, and is refunded when the regular charge is paid.

Sanford Hall will be open for room but not for board during the second term. The rates will be \$20 per single room, and \$15 per person for double room for the term.

## UNIVERSITY COTTAGES

The University operates five cottages for the accommodation of men students and five for the accommodation of women students. Room rental for the Summer Session will be \$15 to \$21 for the first term, and \$13 to \$18 for the second term. No facilities for serving meals are operated in these cottages during the summer. For reservations, apply to Mrs. Catherine McBeath, director of housing, enclosing \$2 for reservation. This will be refunded when term charges are paid.

## 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, may obtain rooms in the Department of Agriculture dormitories. 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.

Rooms will be assigned, during 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 15. They will not be available during the second term.

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

## BUREAU OF RECOMMENDATIONS

The Bureau of Recommendations of the College of Education is operative during the Summer Session. Students who have done sufficient work at the University of Minnesota to secure academic standing here are eligible to the services of the bureau. The office is located at Room 202 Old Library Building.

## CORRESPONDENCE 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 courses have in the Summer Session a chance to complete some of their resident work at a time when many of them are free to do so. All those who are interested and who come to 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 courses may be had at any time by addressing the Correspondence Study Department, General Extension Division, 402 Administration Building.

#### INSTITUTE OF CHILD WELFARE

Because of the high degree of interest manifested in the nursery school and parental education movement, the Institute of Child Welfare, an organization for the scientific study of pre-school children, the training of workers in the child welfare field, and the extension of information to parents, is offering a full program in the first term of the summer school session. The Nursery School and Experimental Kindergarten will also be in session. Students, both undergraduate and graduate, can secure a well-rounded program.

For further information, see the section on the Institute of Child Welfare, page 121.

#### INFORMATION

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

#### 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 unclassified 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 respective college bulletins 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.

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

##### REGISTRATION

In order that the short weeks' 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, Tuesday, June 18, 9 a.m. to 4 p.m., and  
Wednesday, June 19, 9 a.m. to 4 p.m.

For the second term, Saturday, July 27, 9 a.m. to 3 p.m.

The late registration fees are as follows:

For the first term, for those completing the registration on  
Thursday, June 20.....\$2.00  
Friday, June 21..... 3.00  
Saturday, June 22..... 4.00  
Monday, June 24..... 5.00

No registrations are allowed for the first term after Monday, June 24, 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  
Monday, July 29.....\$2.00  
Tuesday, July 30..... 3.00  
Wednesday, July 31..... 4.00

No registrations will be accepted later than Wednesday, July 31, without the special approval of the dean of the school or college concerned, and the payment of a fee of \$4.

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.

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

#### *Changes in Registration*

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

#### FEEES

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 (first or second term of Summer Session).....	\$22.50
Part time (4 credits or less).....	12.50
Incidental fee—required of all students.....	2.50
General deposit .....	2.00

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

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 session.

For fees for students desiring legal time credit in the Medical School, see page 78.

For fees for students registered for clinical courses in the College of Dentistry, see page 93.

For fees for students registered for music courses see page 48.

#### *Refund of Fees*

Students cancelling during the first week of either term for unavoidable reasons will be granted a four-fifths refund. After 3 p.m. Wednesday, June 26, no refunds will be granted for the first term. After Saturday noon, August 3, no refunds will be granted for the second term. All refunds must be approved at window 23, registrar's office.

#### AUDITORS

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 auditor 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 may be waived in exceptional cases. Fees for auditors are the same as for students registered for credit.

#### GRADUATE WORK

It is possible through work in the Summer Session to fulfill the requirements for the Master's degree and absolve in part the requirements for the degree of doctor of philosophy. Any summer session student who is a graduate of a standard college should register through the Graduate School for his courses in the Summer Session.

This bulletin carries an increased number of courses of advanced character. In general, courses numbered above 100 carry graduate credit. There is sufficient work available each summer to fulfill the course requirements for the major and minor in practically any combination of departments.

Graduate students from acceptable colleges may expect to meet the residence and course requirements for the Master's degree in four summer sessions of six weeks or three summer quarters. In the former case, additional work on the thesis will be required in order to make up the equivalent of three quarters.

A full statement of the requirements for advanced degrees may be found in the Graduate School bulletin.

Students should bear in mind the necessity of registering each summer in the Graduate School if they desire their work to be counted for an advanced degree.

#### 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.*—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 purpose 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 July 25, 1929.

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.*—A fee of \$10 is charged for each degree.

### STATEMENT OF COURSES

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.

Following each course is a statement, in parentheses, of credits, classes of students eligible, prerequisite, days of the week, class hour, 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 juniors, seniors, and graduate students, has for a prerequisite Courses 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:

## GENERAL INFORMATION

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### 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, III hour, Thursday

(See *Official Daily Bulletin* for announcements.)

### KEY TO ABBREVIATIONS USED FOR BUILDINGS

#### *Minneapolis Campus Buildings*

A, Armory	Ex, Experimental Engineering Bldg	Oph, Old Physics
AB, Animal Biology	F, Folwell Hall	OT, Ore Testing Works
Ad, Administration Bldg	G, Greenhouse	P, Pillsbury Hall
B, School of Business Adm.	IA, Institute of Anatomy	Ph, Physics Bldg
BM, U.S. Bureau of Mines Bldg	L, Law Bldg	Phm, Pharmacy Bldg
Bot, Botany Bldg	Lib, New Library Bldg	Psy, Psychology Bldg
C, Chemistry Bldg	M, Mines Bldg	S, Stadium
CWI, Child Welfare Institute	ME, Mechanical Engineering Bldg	SBH, State Board of Health Bldg
D, Dentistry Bldg	MGH, Minneapolis General Hospital	Sh, Shevlin Hall
E, Main Engineering Bldg.	MH, Millard Hall	UD, University Dispensary (Basement MH)
Ed, Education Bldg	Mu, Music Bldg	UH, University Hospital
EE, Electrical Engineering Bldg	O, Observatory	WGm, Women's Gymnasium
EMH, Elliot Memorial Hospital	OL, Old Library	
	OLa, Old Law	

#### *University Farm Buildings*

Ad(F), Administration Bldg	HH, Haecker Hall	PP, Botany and Plant Pathology
Bch, Biochemistry Bldg	ODH, Old Dairy Hall	So, Soils Bldg
HE, Home Economics Bldg		

# COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

## GENERAL INFORMATION

The administrative officers of this college and their offices are as follows:

- J. B. Johnston, Dean of the College.....219 Administration Bldg.  
J. M. Thomas, Assistant Dean for the Senior College..219 Folwell Hall  
W. H. Bussey, Assistant Dean for the Junior College.106 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 unclassified 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 statements of prerequisites for courses in this summer session bulletin refer to courses listed in the complete bulletin of the college.

Some of the courses scheduled in this summer session bulletin by the School of Business Administration, the School of Chemistry, the College of Engineering and Architecture, the Medical School, 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.

## ANTHROPOLOGY

### FIRST TERM

- 51su. Introduction to Anthropology. The early history of man. (3 cred.; jr., sr.; no prereq.; MTWThFS I; 15F.) W. D. Wallis.

## ASTRONOMY

### FIRST TERM

- 11su. Descriptive Astronomy. A course of lectures and recitations on the general principles of astronomy, illustrated with lantern slides and by the use of the telescope. (5 cred.; 3d qtr. fr., soph., jr., sr.; no prereq.; MTWFS III-IV; 124F.) W. O. Beal.
- 25su. Stellar Astronomy. Review of present state of knowledge concerning the stars and nebulae. Theories of stellar evolution. (3 cred.; soph., jr., sr.; prereq. 3 cred. in astronomy; MTWThFS II; 124F.) W. O. Beal.

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165su. Selected Topics in Astronomy. An intensive course open to juniors, seniors, and graduates who will be guided through conferences and criticisms in the study of assigned topics. (3 cred.; jr., sr., grad.; prereq., Math. 51, 3 cred. in astronomy; ar.; 123F.) W. O. Beal.

SECOND TERM

11su. Descriptive Astronomy. Same as first term.  
25su. Stellar Astronomy. Same as first term.  
165su. Selected Topics in Astronomy. Same as first term.

BOTANY

FIRST TERM

- 5su.<sup>1</sup> Elementary Plant Histology. An introductory study of the microscopic structure of vascular plants. Textbook, quizzes, lectures, and laboratory. (3 cred.; all; no prereq.; MWF VI, VII, VIII, IX; lect. 06Bot., lab., 7Bot.) H. Oosting, Helen Foot.
- 7su.<sup>1</sup> Taxonomy and Classification of the Flowering Plants. A general study of the identification, classification, and relationships of flowering plants. Lecture, laboratory and field work. (3-5 cred.; no prereq.; MTWThF I, II; lect. 06Bot., lab., 7Bot.) Ethel Mygrant.
- 12su.<sup>2</sup> General Morphology of Algae. (3-5 cred.; all; prereq., 1; TTh VI, VII, VIII, IX and ar.; 8Bot.) Josephine Tilden, Helen Foot.
- 22su. Elementary Plant Physiology. An introductory course giving a general survey of plant functions. (3 cred.; prereq., 1; lect., TTh IV; lab., MWFS III, IV; 104Bot.) G. O. Burr.
- 125, 126su.<sup>2</sup> Morphology and Taxonomy of Marine Algae. Phaeophyceae, Rhodophyceae. Advanced studies in selected groups. (1-5 cred.; prereq., 15 cred. inc. 12, or consent of instructor; WF I, II, III, IV and ar.; 110Bot.) Josephine Tilden.
- 150su.<sup>2</sup> Freshwater Algae. A general survey of freshwater algae based on studies in the field and laboratory. Especially designed for those who, as teachers or research workers, wish to acquire a practical knowledge of the algae. Problems are assigned and reports required. Myxophyceae, Chlorophyceae. (1-10 cred. per term; prereq., 15 cred. incl. 12, or consent of instructor; Sec. 1, TTh I, II, III, IV and ar.; Sec. 2, WF VI, VII, VIII, IX and ar.; 110Bot.) Josephine Tilden.
- 210, 218su.<sup>2</sup> Research Problems in Algae. (1-10 cred.; ar.; 111Bot.) Josephine Tilden.
- 225su. Research Problems in Plant Physiology. (104Bot.) G. O. Burr.
- 236su.<sup>2</sup> Seminar in Algae. (One hour seminar credit per term; ar.; 111Bot.) Josephine Tilden.
- 241su.<sup>2</sup> A Review of Phycological Literature with Reference to Selected Problems. (1-3 cred. per term; ar.; 111Bot.) Josephine Tilden.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

<sup>2</sup> Summer school students may enter for either term, or for both, in any of the above courses offered. See instructor for arrangement of hours.



## SECOND TERM

- 2su.<sup>1</sup> Elementary General Morphology of Plants. A survey of the plant kingdom emphasizing the principles of morphology, embryology, classification, and evolution of plants. Textbook, quizzes, lectures, and laboratory. (3 cred.; all; no prereq.; MWF VI, VII, VIII, IX; lect., 06Bot., lab., 7Bot.) H. Oosting, Helen Foot.
- 12su.<sup>2</sup> General Morphology of Algae. (3-5 cred.; prereq., 2; TTh I, II, III, IV, and ar.; 110Bot.) Josephine Tilden, Helen Foot.
- 21su. Elementary Ecology. An introductory course in the study of plants in relation to their environment. (3 cred.; prereq., 2; MWFS I, II, III; 214Bot.) A. D. Stoesz.
- 125, 126su.<sup>2</sup> Morphology and Taxonomy of Marine Algae. (1-5 cred.; prereq., 15 cred. inc. 12, or consent of instructor; WF I, II, III, IV and ar.; 110Bot.) Josephine Tilden.
- 150su.<sup>2</sup> Freshwater Algae. (1-10 cred. per qtr.; prereq., 15 cred. inc. 12, or consent of instructor; TWThF VI, VII, VIII, IX and ar.; 110Bot.) Josephine Tilden.
- 210, 218su.<sup>2</sup> Research Problems in Algae. (1-10 cred.; ar.; 111Bot.) Josephine Tilden.
- 236su.<sup>2</sup> Seminar in Algae. (One hour seminar credit per term; ar.; 111Bot.) Josephine Tilden.
- 241su.<sup>2</sup> A Review of Phycological Literature with Reference to Selected Problems. (1-3 cred. per term; ar.; 111Bot.) Josephine Tilden.

## COMPARATIVE LITERATURE

## FIRST TERM

- 101su. Drama.\* History of drama from origins to Ibsen. University credit for first quarter of Comparative Literature. (3 cred.; jr., sr., grad.; prereq., jr. college requirement in English and foreign language; MTWThFS II; 113F.) O. W. Firkins.
- 102su. Drama.\* Study of Ibsen. University credit for second quarter of Comparative Literature. (3 cred.; jr., sr., grad.; prereq., junior college requirement in English and foreign language; MTWThFS II, IV; 113F.) O. W. Firkins.

## ECONOMICS

The following courses offered in the School of Business Administration are open to students in the College of Science, Literature, and the Arts. For description of courses see Business Administration, page 118.

## FIRST TERM

- 3su. Mechanism of Exchange.
- 6su. Principles of Economics.
- 14su. Elements of Statistics.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

<sup>2</sup> Summer school students may enter for either term, or for both, in any of the above courses offered. See instructor for arrangement of hours.

\* These courses are of special interest to those taking work in fine arts.

- 25su. Principles of Accounting.
- 30su. Secretarial Training: Shorthand.
- 32su. Secretarial Training: Typewriting.
- 85su. Economics of Marketing.
- 101su. Advanced General Economics. (For the Summer Session this course is the same as Econ. 103, Value and Distribution.)
- 141su. Monetary and Banking Policy.
- 149su. Business Cycles.
- 161su. Labor Problems.
- 190su. Public Finance.

SECOND TERM

- 7su. Principles of Economics.
- 26su. Principles of Accounting.
- 102su. Advanced General Economics. (For the Summer Session this course is the same as Econ. 104, Value and Distribution.)
- 155su. Corporation Finance. (For the Summer Session this course is the same as Econ. 160, The Modern Corporation.)

ENGLISH

COURSES IN ENGLISH

FIRST TERM

- 1su. Freshman Literature. Intended for students who have had work in composition equivalent to that of A-B-C, but who have not had the study of English classics included in that course. This course carries university credit for the work in literature (prose writers) of English A. See Courses in Composition. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS IV; 303, 305F.) F. S. Appel, J. J. Creamer.
- 2su. Freshman Literature. A continuation of 1su. This course carries university credit for the work in literature (drama) of English B. See Courses in Composition. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS II; 305F.) Adah Grandy.
- 3su. Freshman Literature. A continuation of 2su. This course carries university credit for the work in literature (types of poetry) of English C. See Courses in Composition. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS I; 311F.) Ruth Christie.
- 22su. Introduction to English Literature. This course carries university credit for the second quarter of English 21-22-23. An intensive study of the leading writers of poetry and prose and of their historical background. Addison and Steele, Swift, Pope, Fielding, Johnson, Boswell, and Sheridan. (5 cred.; all; prereq., English A-B-C, or Composition 4-5-6, or exemption from requirement; MTWFS II, III; 306F.) M. S. MacLean.
- 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.;<sup>1</sup> MTWThF V, and W VIII; 306F.) Elizabeth Jackson.
- 56su. Shakespeare. A continuation of 55su. The reading of *Richard II*, *Henry IV*, 1 and 2, *Henry V*, *Richard III*, *Julius Caesar*, *Hamlet*, *Macbeth*, with collateral reading. (3 cred.; jr., sr.; prereq.;<sup>1</sup> MTWThF VI and 1 hr. ar.; 306F.) J. N. D. Bush.
- 58su. Nineteenth-Century Prose. The more important prose of the nineteenth century not including fiction. This course carries university credit for the first quarter of English 58-59. (3 cred.; jr., sr.; prereq., C or 23, or 31-32; MTWThFS II; 303F.) Mary Ellen Chase.
- 62su. Milton, with some consideration of his contemporaries. (3 cred.; jr., sr.; prereq., 21-22 or 55-56; MTWThFS I; 205F.) T. P. Beyer.
- 73su. American Literature. This course carries university credit for the first quarter of English 73-74. (3 cred.; jr., sr.; prereq.;<sup>1</sup> MTWThFS IV; 204F.) G. T. 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.;<sup>1</sup> MTWThFS III and 1 hr. ar.; 205F.) M. B. Ruud.
- 77su. Classic Myths and the Classic Tradition in English Poetry. Some ancient literature (in translation) and representative poets from Chaucer to the present. (3 cred.; jr., sr.; prereq.;<sup>1</sup> MTWThFS IV; 311½F.) J. N. D. Bush.
- 100su. Old English. Old English prose and poetry. The relation to modern English is particularly emphasized. (3 cred.; jr., sr., grad.; prereq., 8 cred. above 50; MTWThFS III and 1 hr. ar.; 213F.) F. Klaeber.
- 103su. Beowulf. An introduction to the Old English poem, with reading of considerable portions of the text. (3 cred.; jr., sr., grad.; prereq., 100; ar. IV; 205F.) F. Klaeber.
- 105su. Eighteenth-Century Poetry. From Pope to Burns, with special reference to the rise and growth of romanticism. This course carries university credit for the first quarter of English 105-106. (3 cred.; jr., sr., grad.; prereq., 8 credits above 50; MTWThFS II; 204F.) C. A. Moore.
- 108su. Eighteenth-Century Prose. Special study of fiction and the essay. This course carries university credit for the second quarter of English 107-108. (3 cred.; jr., sr., grad.; prereq., 8 cred. above 50; MTWThFS IV; 306F.) C. A. Moore.
- 110su. Romantic Poets. The Romantic Poets of the nineteenth century. This course carries university credit for the second quarter of English 109-110. (3 cred.; jr., sr.; prereq., 8 credits above 50; MTWThF VI and 1 hr. ar.; 205F.) Mary Ellen Chase.
- 140su. Advanced Chaucer. The more important poems (except those read in Course 75). The treatment will be primarily literary and historical, linguistic proficiency being presumed. (3 cred.; jr., sr., grad.; prereq., 8 credits above 50, including 75; MTWThFS I; 303F.) M. B. Ruud.

<sup>1</sup> English A-B-C, or Composition 4-5-6 and 6 additional credits, or 10 credits in English 21-22-23.

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- 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., 8 credits above 50; MTWThF VI; T VIII; 204F.) Elizabeth Jackson.
- 155su. American Novel. The history of the American novel from the beginning to the close of the nineteenth century. (3 cred.; jr., sr., grad.; prereq., 73-74; MTWFS III and 1 hr. ar.; 204F.) G. T. McDowell.

SECOND TERM

- 1su. Freshman Literature. See First Term, Course 1su. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS IV; 205F.) Amy Armstrong.
- 2su. Freshman Literature. See First Term, Course 2su. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS II; 305F.) Frances del Plaine.
- 3su. Freshman Literature. See First Term, Course 3su. (3 cred.; soph., jr., sr.; prereq., 9 cred. in comp.; MTWThFS I; 305F.) H. E. Briggs.
- 56su. Shakespeare. See First Term, Course 56su. (3 cred.; jr., sr.; prereq.,<sup>1</sup> MTWThFS II; 205F.) L. B. Hessler.
- 59su. Nineteenth-Century Prose. A continuation of 58su. This course carries university credit for the second quarter of English 58-59. (3 cred.; jr., sr.; prereq., C or 23, or 31-32; MTWThFS II; 303F.) Elizabeth Atkins.
- 70su. Elizabethan Drama. Elizabethan dramatic art aside from Shakespeare's. Special attention to the art of the chief writers—Marlowe, Jonson, Beaumont and Fletcher, Webster, and Massinger. (3 cred.; jr., sr.; prereq., 55-56; MTWThFS I; 303F.) L. B. Hessler.
- 74su. American Literature. This course carries university credit for the second quarter of English 73-74. (3 cred.; jr., sr.; prereq.,<sup>1</sup> MTWThFS IV; 303F.) C. W. Nichols.
- 109su. Romantic Poets. The Romantic Poets of the nineteenth century. (3 cred.; jr., sr., grad.; prereq., 8 cred. above 50; MTWFS III and 1 hr. ar.; 303F.) C. W. Nichols.

COURSES IN COMPOSITION

FIRST TERM

- Asu. Freshman English. The study of the fundamental principles of composition; training in the art of writing; an intensive study of selected classics of English literature. This course carries university credit for the first quarter of English A-B-C. (5 cred.; all; prereq., placement test; MTWThFS IV, MTWThF VII; Sec. 1, 303F; Sec. 2, 305F.) F. S. Appel, J. J. Creamer.
- Bsu. Freshman English. A continuation of Asu. This course carries university credit for the second quarter of English A-B-C. (5 cred.; all. prereq., English A; MTWThFS II, MTWThF VI; 305F.) Adah Grandy.

<sup>1</sup> English A-B-C, or Composition 4-5-6 and 6 additional credits, or 10 credits in English 21-22-23.

- Csu. Freshman English. A continuation of Bsu. This course carries university credit for the third quarter of English A-B-C. (5 cred.; all; prereq., English A-B; MTWThFS I, MTWThF VI; 311F.) Ruth Christie.
- 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 Composition 4-5-6, or of Composition 1-2-3 of preceding years. (3 cred.; all; prereq., placement test; MTWThF VII and 1 hr. ar.; Sec. 1, 303F; Sec. 2, 305F.) F. Appel, J. J. Creamer.
- 5su. Freshman Composition. A continuation of 4su. This course carries university credit for the second quarter of Composition 4-5-6. (3 cred.; all; prereq., Comp. 4; MTWThF VI and 1 hr. ar.; 305F.) Adah Grandy.
- 6su. Freshman Composition. A continuation of 5su. This course carries university credit for the third quarter of Composition 4-5-6. (3 cred.; all; prereq., Comp. 4, 5; MTWThF VI and 1 hr. ar.; 311F.) Ruth Christie.
- 11su. Description. This course carries university credit for the first quarter of Composition 11-12. (3 cred.; soph., jr., sr.; prereq., English A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThFS IV and 1 hr. ar.; 311F.) Margaret Gable.
- 19su. Types of Writing. Description and narration. Intended for students who do not plan to take advanced work in narrative writing. (3 cred.; soph., jr., sr.; prereq., A-B-C or 4-5-6 or exemption from requirement; MTWThF VII and 1 hr. ar.; 306F.) Margaret Gable.
- 111su. Composition. Practice in the writing of biographical essay. Analysis of a considerable body of modern essays. This course carries university credit for the first quarter of Composition 111-112-113. (3 cred.; jr., sr., grad.; prereq., 11-12, or 18-19, and 10 or 20; MTWFS III and 1 hr. ar.; 303F.) T. P. Beyer.

## SECOND TERM

- Asu. Freshman English. See First Term, Course Asu. (5 cred.; all; prereq., placement test; MTWThFS IV, MTWThF VII; 205F.) Amy Armstrong.
- Bsu. Freshman English. See First Term, Course Bsu. (5 cred.; all; prereq., English A; MTWThFS II, IV; 305F.) Elizabeth Atkins, Frances del Plaine.
- Csu. Freshman English. See First Term, Course Csu. (5 cred.; all; prereq., English A-B; MTWThFS I, MTWFS III and 1 hr. ar.; 305F.) H. E. Briggs.
- 4su. Freshman Composition. See First Term, Course 4su. (3 cred.; all; prereq., placement test; MTWThF VII and 1 hr. ar.; ar.) Amy Armstrong.
- 5su. Freshman Composition. See First Term, Course 5su. (3 cred.; all; prereq., Comp. 4; MTWTh IV; 305F.) Elizabeth Atkins.

- 6su. Freshman Composition. See First Term, Course 6su. A continuation of 5su. (3 cred.; all; prereq., Comp. 4, 5; MTWFS III and 1 hr. ar.; 305F.) H. E. Briggs.
- 12su. Narration. Continuation of 11su. This course carries university credit for the second quarter of Composition 11-12. (3 cred.; soph., jr., sr.; prereq., A-B-C or 4-5-6 or exemption from requirement; MTWFS III and 1 hr. ar.; 205F.) Frances del Plaine.

## GEOGRAPHY

### FIRST TERM

- 51su. Human Geography. A study of the factors of the physical environment and their effect on human activities. (5 cred.; jr., sr.; no prereq.; MTWThF I-II; 103OL.) F. E. Williams and assistant.
- 61su. Geography of Commercial Production. The principal commodities of world trade, with reference to areas of origin and consumption and the geographic elements in their production. (3 cred.; jr., sr.; no prereq.; MTWFS III; 103OL.) R. Hartshorne.
- 101su. Geography of Europe. The geographic basis for distribution of population and human activities in the principal countries of Europe. (3 cred.; jr., sr., grad.; prereq., 51, 61, or equiv.; MTWFS IV; 103OL.) R. Hartshorne.

### SECOND TERM

- 61su.<sup>1</sup> Geography of Commercial Production. The principal commodities of world trade, with reference to areas of origin and consumption and the geographic elements in their production. (3 cred.; jr., sr.; no prereq.; MTWFS III; 103OL.) F. L. Thomas.
- 110su. Geography of South America. A study of the major geographic regions of South America, with emphasis upon the economic activities and their geographic basis. (3 cred.; jr., sr., grad.; prereq., 51, 61, or equiv.; MTWFS IV; 103OL.) F. L. Thomas.

## GEOLOGY

### FIRST TERM

- 1su. General Geology. An introductory study of earth materials and geologic processes. Lectures with a limited amount of laboratory work and field excursions. (5 cred.; all; no prereq.; TWThFS II; 110P.) C. R. Stauffer.

## GERMAN

### FIRST TERM

- 1su. Beginning A. (5 cred.; all; no prereq.; MTWThF I-II; 207F.) O. C. Burkhard.
- 3su. Beginning C. (5 cred.; all; prereq., 2; or two years prep. German; MTWFS III-IV; 209½F.) K. Ermisch.

<sup>1</sup> A repetition of the course offered the first term.

- 4su. Intermediate German. Modern narrative prose. (5 cred.; all; prereq., 3; or three years prep. German; MTWThF I-II; 209F.) G. F. Lussky.
- 63su.\* Modern Drama. (3 cred.; jr., sr.; prereq., 4 or 8 or equiv.; MTWThFS II; 209½F.) K. Ermisch.
- 142su. Problems in Sixteenth Century Literature. (3 cred.; sr., grad.; prereq., 65 or 66 and 11 cred. above 60; 209F.) G. F. Lussky.
- 150su. Dorfgeschichte. (3 cred.; sr., grad.; prereq., 67 and 11 cred. above 60; ar.; 301Lib.) O. C. Burkhard.

## SECOND TERM

- 2su. Beginning B. (5 cred.; prereq., 1 or one yr. prep. German; MTWThF I-II; 207F.) J. Davies.
- 160su. Lyric Poetry. (3 cred.; sr., grad.; prereq., 66 or 67 and 11 cred. above 60; MTWThFS III; 207F.) J. Davies.

## GREEK

## FIRST TERM

## COURSES FOR WHICH NO KNOWLEDGE OF GREEK IS REQUIRED

- 42su.\* Greek Sculpture. Development of Greek sculpture from its beginnings will be traced; famous statues, friezes, reliefs, and monuments will be shown and described; personalities of the great sculptors and their special contribution to art will be considered. (2 cred.; soph., jr., sr.; no prereq.; MTWF II; 114F.) C. A. Savage.
- 44su.\* Greek Literature and Life. Lectures, textbook work, illustrative and assigned readings. The character and influence of Greek culture, especially in literature, philosophy, and art, will be discussed; the whole course will be richly illustrated with the stereopticon. (2 cred.; soph., jr., sr.; no prereq.; MTWF III; 114F.) C. A. Savage.
- 45su. Greek Mythology. Lectures, readings, and textbook work dealing with the legends which appear in the literature and art of ancient Greece; stereopticon illustrations. The myth will be presented and interpreted; its origin, evolution, and influence will be discussed. (2 cred.; soph., jr., sr.; no prereq.; MTWTh IV; 114F.) C. A. Savage.

## HISTORY

## FIRST TERM

- 1su. Modern World, 1648-1815. (5 cred.; all; no prereq.; MTWFS III; MTWThF IV; Sec. 1, Sec. 2, 112OL.) Faith Thompson, G. N. Tucker.
- 7su. American History, 1783-1844. Survey of the various factors of the history of the United States during the early national period. (5 cred.; soph., jr., sr.; no prereq.; MTWThF I-II; 112OL.) G. M. Stephenson.
- 19su. Political History of Rome to the End of the Second Century A.D. (3 cred.; soph., jr., sr.; no prereq.; MTWThFS I; 109F.) R. V. Cram.

\* These courses are of special interest to those taking work in fine arts.

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- 80su. Introduction to Economic History. (3 cred.; jr., sr.; prereq., 15 credits in history or 10 cred in economics; MTWThFS II; 111OL.) H. Heaton.
- 101su. French Revolution. (3 cred.; jr., sr., grad.; prereq., 15 cred. in history or 20 cred. in soc. sci. incl. 10 cred. in history; MTWThFS IV; 111OL.) G. N. Tucker.
- 125su. American Diplomatic History. A survey of the foreign relations of the United States during the earlier national period. (3 cred.; jr., sr., grad.; prereq., 15 cred. in history; MTWThFS I; 209OL.) L. B. Shippee.
- 130su. Introduction to the History of Russia. (3 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. incl. History 1-2 or 14-15-16 or equiv.; MTWThFS II; 209OL.) L. D. Steefel.
- 159su. Topics in Modern European History: The origin of the World War. (3 cred.; sr., grad.; prereq., 20 cred. and consent of instructor. Limited to 12 students. Preference will be given those able to use books in French and German; 2 two-hour periods; ar.) L. D. Steefel.
- 169su. Topics in Economic History: American Colonial Period. (3 cred.; sr., grad.; prereq., 20 cred. in history or economics, including 10 cred. in American history; 2 two-hour periods; ar.) H. Heaton.
- 171su. Topics in Recent American History. (3 cred.; sr., grad.; prereq., 20 cred. and consent of instructor; MTh VII, VIII.) L. B. Shippee.
- 220su. Research in Selected Historical Fields. (Cred. ar.; grad.; prereq., consent of instructor in particular field.) Medieval, Faith Thompson; Modern European, L. D. Steefel; American, L. B. Shippee, G. M. Stephenson; Economic, H. Heaton.

SECOND TERM

- 6su. England since 1815. (3 cred.; all; no prereq.; MTWThFS II; 112OL.) D. H. Willson.
- 8su. American History, 1844-76. Survey of the various factors of the history of the United States during the middle national period. (5 cred.; soph., jr., sr.; no prereq.; MTWThF III-IV; 112OL.) E. Osgood.
- 109su. Europe since 1914. (3 cred.; jr., sr., grad.; prereq., 15 cred.; MTWThFS III; 111OL.)
- 124su. European Expansion since 1815. (3 cred.; jr., sr., grad.; prereq., 15 cred.; MTWThFS I; 112OL.) D. H. Willson.
- 140su. New Viewpoints in American History. (3 cred.; jr., sr., grad.; prereq., a college course in American history or government, MTWThFS II; 111OL.) S. J. Buck.
- 160su. Topics in Recent European History. (3 cred.; sr., grad.; prereq., 20 cred.; 2 two-hour periods; ar.)
- 220su. Research in Selected Historical Fields. (Cred. ar.; grad.; prereq., consent of instructor in particular field.) S. J. Buck, E. Osgood, D. H. Willson.



## JOURNALISM

## FIRST TERM

- 5su.<sup>1</sup> The American Newspaper. A survey of the history, organization, and methods of contemporary journalism, followed by an analysis of the relations of newspapers to their readers. (3 cred.; soph.; jr., sr.; no prereq.; MTWThFS IV; 206P.) C. R. Bush.
- 73su.<sup>1</sup> Newspaper and Magazine Articles. Lectures and practices in gathering and preparing material for special articles. (3 cred.; jr., sr.; prereq., 15 or equivalent; MTWThF II; 206P.) C. R. Bush.
- 82su.<sup>1</sup> Supervision of School Publications. (3 cred.; jr., sr.; prereq. 41 or 51 or equivalent; MTWThFS I; 206P.) F. L. Kildow.

## LATIN

## FIRST TERM

- 147su. Histories of Tacitus. (3 cred.; jr., sr.; prereq., any two of 51, 52, 71, 62, 63, or 73, or six years of Latin [with credit]; without credit, consult instructor; MTWThFS II; 109F.) R. V. Cram.
- 221-222-223su. Graduate Seminar; Lucretius. (6 cred.; grad. only; consult instructor.) R. V. Cram.

## LIBRARY INSTRUCTION

## FIRST TERM

NOTE.—Two years work of collegiate grade is prerequisite to credit in courses in Library Instruction. Non-credit students in these courses must secure the approval of the Library Division of the Minnesota State Department of Education, if Minnesota students, or of the director of the Division of Library Instruction, if non-resident students.

- 102su. Cataloging. Author, title, and subject entries for dictionary catalogs. Use of Library of Congress and simplified entries. (3 cred.; MTWThFS I; 5Lib.) Rae Stockham.
- 105su. Classification. Classification by the Dewey Decimal System for public and school libraries. Relation of classification and subject headings. Cutter author numbers, shelf list, and accession records. (3 cred.; MTWThFS III; 5Lib.) Rae Stockham.
- 112su. Reference. General reference works with relation to methods of search and adaptation of material to needs of users. (3 cred.; MTWThFS IV; 5Lib.) F. K. Walter.
- 113su. Reference. Specialized reference material, public documents, and periodicals. Preparation of reference lists and reports on specific problems. (3 cred.; prereq., 112su or equiv.; MTWThFS II; 5Lib.) Lura Hutchinson.
- 116su. Selection of Books for Adults. Discussion of specific types of books suited to libraries. Preparation of book lists. (3 cred.; prereq., Lib. Meth. 115 or equiv.; MTWThFS III; 3Lib.) Lura Hutchinson.

<sup>1</sup>A laboratory fee of \$1 is charged for this course.

## MATHEMATICS

## FIRST TERM

- 5su. Higher Algebra. A review and a collegiate treatment of the topics of elementary algebra for those who have had one year of algebra. Not open for credit to those who presented higher algebra for entrance. (5 cred.; all; 1 yr. elementary algebra; MTWThF VI-VII; 105F.) M. Rosskopf.
- 6su. Trigonometry. Logarithms and plane trigonometry. (5 cred.; all; prereq., 5 or prep. higher algebra; MTWThF I-II; 104F.) Borghild Gunstad.
- 7su. College Algebra. Quadratic equations, graphical representation; progressions; mathematical induction; binomial theorem; permutations; combinations; probability; determinants; theory of equations. (5 cred.; all; prereq., 5 or prep. higher algebra; MTWF III-IV and Th IV-V; 104F.) P. G. Hoel.
- 30su. Analytic Geometry. See College of Engineering, page 64.
- 50su. Calculus I. Differential calculus. (5 cred.; jr., sr.; prereq., 30; MTWThF I-II; 105F.) Elizabeth Carlson, M. Rosskopf.
- 51su. Calculus II. Integral calculus. Given in the College of Engineering. See page 64.
- 53su. Calculus IIIa. Selected topics in differential and integral calculus with special reference to infinite series, partial differentiation, multiple integrals, and applications of the calculus. (3 cred.; jr., sr.; prereq., 51; MTWThFS I; 101F.) R. W. Brink.
- 72su. History of Ancient and Modern Mathematics. An account of the origin and development of the fundamental notions of mathematics from the earliest times, and of the modification and enlargement of their significance in the light of modern research. (3 cred.; jr., sr.; prereq., 50; MTWFS III and Th V; 105F.) D. Jackson.
- 106su. Differential Equations. (3 cred.; jr., sr., grad.; prereq., 51; MTWFS III and Th V; 101F.) Elizabeth Carlson.
- 109su. Theory of Numbers. A first course in number theory. (3 cred.; jr., sr., grad.; prereq., 51; MTWThFS II; 102F.) J. V. Uspensky.
- 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. (Cred. ar.<sup>1</sup>; jr., sr., grad.; prereq., 51; ar.) R. W. Brink, D. Jackson, J. V. Uspensky.
- 143su.<sup>2</sup> Fourier, Legendre, and Bessel Series. A study of the characteristic properties of certain types of series which are of importance in pure mathematics and in mathematical physics. (3 cred.; jr., sr., grad.; prereq., 51; MTWThFS IV; 105F.) D. Jackson.

<sup>1</sup> The number of credits is 3 or more according to the amount of work done.

<sup>2</sup> Courses 143su and 144f involve some duplication of material. Course 143su may not be taken by students who have credit in Course 144.

## SECOND TERM

- 6su. Trigonometry. Logarithms and plane trigonometry. (5 cred.; all; prereq., 5 or prep. higher algebra; MTWThF III-IV; 105F.) M. Rosskopf.
- 30su. Analytic Geometry. Given in the College of Engineering. See page 64.
- 51su. Calculus II. Integral calculus. (5 cred.; jr., sr.; prereq., 50; MTWThF I-II; 105F.) A. L. Underhill, M. Rosskopf.
- 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. (Cred. ar.<sup>1</sup>; jr., sr., grad.; prereq., 51; ar.) A. L. Underhill, J. V. Uspensky.
- 114su. Probability. Recent developments in the mathematical theory of probability. (3 cred.; jr., sr., grad.; prereq., 51; MTWThFS II; 104F.) J. V. Uspensky.

## MUSIC

The courses below, for which no special fee is indicated, may be taken by summer session students on payment of the regular summer session fee. Students who pay as much as \$36 per term for special music fees may enroll for other courses in any department of the Summer Session, for an additional fee of \$14 per term, making a total of \$50 for general and special fees. All students who register for either the general courses or the special courses must pay the \$2 deposit.

Credits for courses in music earned by a freshman or sophomore of the College of Science, Literature, and the Arts are withheld until the student's junior year unless he is regularly taking the music curriculum.

## FIRST TERM

- 1su. Harmony. The study of chords, their construction, relations, and progressions. Written exercises on bases, the harmonization of given melodies. (3 cred.; no prereq.; MWF VI-VII; 103Mu.) C. M. Scott.
- 3su. Harmony. A continuation of Harmony 2, which offers the work of the third quarter of the regular year. (3 cred.; prereq., 1-2; MWF III-IV; 103Mu.) C. M. Scott.
- 9su. Ear Training. A continuation of Ear Training 8, which offers the work of the third quarter of the regular year. (1 cred.; prereq., 7-8; Th I-II; Mu.) Blanche Kendall.
- 13su. Class Instrument Teaching. Primarily for College of Education students. Not open to S., L., and A. students. See College of Education, page 110.
- 39su. Piano. Open to those who have mastered technical difficulties of the degree of Czerny's *School of Velocity* and the easier Haydn and Mozart sonatas. Two lessons a week. Fee, \$36. (2 cred.; ar.; Mu.) D. N. Ferguson, W. Lindsay, Blanche Kendall.

<sup>1</sup>The number of credits is 3 or more according to the amount of work done.

- 42su. Orchestra. Laboratory for the study of orchestral literature, symphonic and miscellaneous. Orchestra will assist in campus functions and enter with the student body in the maintenance of a true campus spirit. Applicants will bring their own instruments. (1 cred.; M IX-X; MuAud.) A. Pepinsky.
- 45su. Chorus. Choral singing. (1 cred.; all; TTh IX; Mu.) E. Killeen.
- 49su. Historical Appreciation of Music. An outline of the development of musical thought with emphasis on the history and significance of classical and contemporary forms. Extensively illustrated. (3 cred.; no prereq.; MWF; Mu.) D. N. Ferguson.
- 51su. Violin. Open to students who are qualified to play the first ten of Kreutzer's *Forty Etudes*, and the easier Handel and Mozart sonatas. Two lessons a week. Fee, \$36. (2 cred.; ar.; Mu.) K. Scheurer.
- 63su. Voice. Thoro training in relaxation and breath control, the foundation of tone production. Advantages offered to advanced singers in study of the best vocal literature, songs, oratorio, and opera. Two lessons a week. Fee, \$36. (2 cred.; ar.; Mu.) E. Killeen, Agnes R. Snyder.
- 75su. Public School Music for the Grades. Primarily for College of Education students. Not open to S., L., and A. students. See College of Education, page 110.
- 78su. Public School Music for High Schools. Primarily for College of Education students. Not open to S., L., and A. students. See College Education, page 110.
- 93su. Normal Course for Teaching of Voice. A lecture course in which principles of teaching, breathing, voice placing, and development of vocal technique are discussed. (2 cred.; TTh VII-VIII; 3Mu.) E. Killeen.
- 94su. Ensemble Playing, Sight Reading, and Accompanying. Study of chamber music literature, for various combinations of instruments. Simple sonata literature used for sight reading and accompanying, after which the more serious ensemble literature will be reviewed. (2 cred.; TTh VI-VII; Mu.) A. Pepinsky.
- 100su. Organ. Open to students who play piano music of an intermediate grade. Two lessons a week. Fee, \$36. (2 cred.; ar.; Mu.) G. H. Fairclough.

## PHILOSOPHY

### FIRST TERM

- 1su. Problems of Philosophy. A survey course, in which the main fields of investigation are mapped out, the permanent problems indicated, and the chief methods in their solution discussed. (3 cred.; soph., jr., sr.; no prereq.; MTWThFS I; 322F.) G. P. Conger.
- 2su. Logic. The nature of knowledge, the laws of reasoning, the principles and methods of scientific proof. (3 cred.; soph., jr., sr.; no prereq.; MTWFS III, Th II; 321F.) D. F. Swenson.

- 101su. Psychology of Religion. A discussion of the relations of some problems of psychology to some problems of religion. (3 cred.; jr., sr., grad.; prereq., 10 cred. in phil. or psy.; MTWThFS II; 322F.) G. P. Conger.
- 103su.\* Esthetics. An introduction to the history and theory of esthetics, a psychological analysis of beauty, and a discussion of the arts. (3 cred.; jr., sr., grad.; prereq., 10 cred.; MTWThFS IV; 322F.) D. F. Swenson.

## PHYSICS

## FIRST TERM

- 3su. Elements of Mechanics. Mechanics of solids, liquids, and wave motion. Study of the simple fundamental principles. The first part of the General Course 3, 23, 33, 43. Course 4 should be taken in conjunction with this course. Part of the required work in physics in the pre-medical and engineering courses. (3 cred.; all; prereq., Math. 4 or 6; lect., MTWThFS I; quiz, F IX; 133Ph.) J. W. Buchta.
- 4su.<sup>1</sup> Mechanics Laboratory Practice. Measurements in the mechanics of solids, liquids, and wave motion. The laboratory part supplementing Course 3. (1 cred.; all; prereq., 3 or reg. in 3; MW VI-VII; 153Ph.) J. W. Buchta.
- 23su. Heat. A study of the principles underlying heat phenomena. Course 24 should be taken in conjunction with this course. This course is a part of the required work in physics in the pre-medical and engineering courses. (3 cred.; all prereq., 3; lect., MTWThFS II; quiz F IX; 133Ph.) L. F. Miller.
- 24su.<sup>1</sup> Heat Laboratory. The laboratory part supplementing Course 23. Two two-hour sessions in laboratory a week. (1 cred.; all; TTh VI-VII; 244Ph.) L. F. Miller.
- 109su. Intermediate Electricity and Magnetism. An introduction to the theoretical study of electricity and magnetism. Topics covered are electrostatics, magnetostatics, electric and magnetic properties of materials, the electric current, concluding the course with the Maxwell field equations and electromagnetic radiation. Text—Starling, *Electricity and Magnetism*. (3 cred.; all; prereq., integral calculus; TS II-III, Th II, 1 hr. quiz. ar.; 145Ph.) J. W. Buchta.
- 110su. Thesis. (No cred.; ar.) H. A. Erikson, L. F. Miller, J. W. Buchta.
- 124su. Pyrometry. A theoretical and experimental study of different principles involved in temperature measurement, covering standardization and calibration with some practical considerations. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; MWF VI-IX; 244Ph.) L. F. Miller.
- 126su. Advanced Heat. A more advanced theoretical and experimental study of heat phenomena. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; ar.) L. F. Miller.

\* These courses are of special interest to students taking courses in fine arts.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

- 127su. Modern Physics. An introductory survey of the problems of modern physics. Theories of atomic structure, and series in optical spectra, photoelectric effect, and other applications of the quantum theory. An introduction to the special theory of relativity. Text—Richtmyer, *Introduction to Modern Physics*. (3 cred.; jr., sr., grad.; prereq., 12 cred. in physics, Math. 51; MWF II-III; 145Ph.) J. W. Buchta.
- 148su.<sup>1</sup> Radioactivity. The various theories and methods of investigation. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; MWF p.m.) H. A. Erikson.
- 150su. Conduction through Gases. An experimental course devoted to ionization and mobility measurements. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; TThS p.m.) H. A. Erikson.
- 152su. X-Rays. A study of the nature and production of X-rays. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; ar.; 145Ph.) H. A. Erikson.

## SECOND TERM

- 33su. Optics. A study of the principles underlying optical instruments and light phenomena. Course 34 should be taken in conjunction with this course. (3 cred.; all; prereq., 3; lect., MTWThFS II; quiz, Th IV; 166Ph.) J. Valasek.
- 34su.<sup>1</sup> Optics Laboratory. The laboratory part supplementing Course 33. Two two-hour sessions in the laboratory a week. (1 cred.; all; MW III-IV; 236Ph.) J. Valasek.
- 43su. Electricity. A study of the principles underlying magnetic and electrical phenomena. Course 44 should be taken in conjunction with this course. This course is a part of the required work in physics in the pre-medical and engineering courses. (3 cred.; all; prereq., 3; lect., MTWThFS I; quiz, Th IV; 166Ph.) A. Zeleny.
- 44su.<sup>1</sup> Electrical Laboratory. The laboratory part supplementing Course 43. Two two-hour sessions in laboratory a week. (1 cred.; all; prereq., 3, 43, or reg. in 43; TS III-IV; 231Ph.) A. Zeleny.
- 134su. Applied Optics. Special experimental work in spectrometry, optical instruments, photometry, absorption, polarized light. Three four-hour laboratory periods a week. (3 cred.; jr., sr., grad.; prereq., 34; ar.) J. Valasek.
- 136su. Spectrum Analysis. An experimental course dealing with the measurement of wave lengths, intensities, and absorption coefficients in the infra-red, visible, and ultra-violet regions of the spectrum. Three 4-hour laboratory periods a week. (3 cred.; jr., sr., grad.; prereq., 34; ar.) J. Valasek.
- 144su.<sup>1</sup> Electrical Measurements. Devoted mainly to the study of potentiometer methods, capacity, inductance, resistance, magnetic flux. (3 cred.; jr., sr., grad.; prereq., 12 cred. in phys.; MWF VI-IX; 232Ph.) A. Zeleny.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

- 146su.<sup>1</sup> Advanced Electrical Measurements. Standard measurements of the various electric quantities including the use of precision instruments. A continuation of Course 144. (3 cred.; jr., sr., grad.; ar.) A. Zeleny.

## POLITICAL SCIENCE

## FIRST TERM

- 15su. American National Government. Origin and nature of the American governmental system; organization and actual workings of the national government today. (4 cred.; soph., jr., sr., and fr. with 10 cred. in econ. or history; no prereq.; TWThF I-II; 211OL.) J. S. Young.
- 115su. Municipal Government. The growth of cities in the United States; their position in the system of government; charters, powers, and duties; plans of organization; functions and administration. (4 cred.; soph., jr., sr.; prereq., 1; TWThF I-II; 221OL.) W. Anderson.
- 155su. Introduction to Political Science. The process of formulating and expressing public opinion in governmental action, with observations on the forms and methods of government, both in the United States and Europe, as aids and hindrances to such process. (4 cred.; soph., jr., sr.; prereq., 1, or consent of instructor; TWF III-IV, Th IV; 209OL.) A. F. Saunders.
- 255su. World Politics. A study of the foreign policies and international relations of the leading European powers today. (4 cred.; soph., jr., sr.; prereq., 1, or 10 cred. in history; TWF III-IV, Th IV; 211OL.) H. S. Quigley.
- 1015su. Constitutional Law. Constitutional basis of federal-state relations; interstate relations; powers of the national government; interrelations of national government departments. (3 cred.; jr., sr., grad.; prereq., 15 cred. or consent of instructor; MTWThFS II; 101F.) O. P. Field.
- 1045su. Problems in State Government. Special attention to Minnesota government. Intensive comparative study of one major activity in a number of states. (3 cred.; jr., sr., grad.; prereq., 2, or 15 cred., or consent of instructor; MTWFS III; 111OL.) O. P. Field.
- 1095su. Government and Business. Governmental powers; restraint of trade and manipulation of prices; protection of debtors; business affected with a public interest; combinations of laborers; compulsory benefits; conservation of natural wealth; vested rights; confiscatory legislation. (2 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. or approval of instructor; TWThF IV; 221OL.) J. S. Young.
- 1415su.<sup>2</sup> Contemporary Japan. The political system of Japan; the forces that control Japanese politics; current issues in Japanese foreign relations. (2 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. or consent of instructor; TWThF I; 111OL.) H. S. Quigley.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

<sup>2</sup> Not open to those who have had Pol. Sci. 153-154 (Hist. 136-137) or Pol. Sci. 191-192 (Hist. 138-139).

- 161su. Current Political Thought. The reaction against orthodox ideas of democracy and the state; scientific attempts to find a new basis for political thinking. (2 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. or consent of instructor; MTWF III; 221OL.) W. Anderson.
- 175su. Political Parties. Analysis of the nature and activity of political groups in current American politics. Evaluation of the rôle of the legally recognized political party as an agent for popular government. (2 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. or consent of instructor; TWThF I; 102F.) A. F. Saunders.
- 241su. Seminar for Research in Selected Fields of Political Science. (Cred. ar.; prereq., consent of department.) All members of staff.

#### SECOND TERM

- 1su. American National Government. Same as first term. J. S. Young.
- 2su. State Government. A comparative study of American state governments. The adoption and amendment of constitutions; organization, powers, and methods of the three departments; problems of administrative organization. (4 cred.; soph., jr., sr.; prereq., 1; TWThF I-II; 209OL.) M. B. Lambie.
- 3su. Comparative European Government. The governments and politics of the great European powers today. (5 cred.; soph., jr., sr.; prereq., 1; MTWThF III-IV; 211OL.) J. R. Starr.
- 107su. Recent Social Legislation. Governmental powers and methods used for social legislation, both state and federal; peace and security; safety and health; public morals; semi-social economic relations, social advertising, minimum wage, city planning, etc. (2 cred.; jr., sr., grad.; prereq., 20 cred in soc. sci. or consent of instructor; TWThF IV; 209OL.) J. S. Young.
- 131su. Principles of Public Administration. Source of administrative power; the budget; personnel; materials; organization; control. (2 cred.; jr., sr., grad.; prereq., 20 cred. in soc. sci. or consent of instructor; MTWF III; 221OL.) M. B. Lambie.
- 242su. Seminar for Research in Selected Fields of Political Science. (Cred. ar.; prereq., consent of department.) J. S. Young, M. B. Lambie.

#### PSYCHOLOGY

##### FIRST TERM

- 1su,2su.\* General Psychology. The fundamental facts and laws of mental life and behavior. Lectures, recitations, and demonstrations. (6 cred.; soph., jr., sr.; no prereq.; lect., MTWThFS V; OLAud.; Sec. 1, MTWThF I; 211Psy.; Sec. 2, MTWThF II; 211Psy.) C. Bird, Edna Heidbreder, W. T. Heron.
- 4su,5su. Introductory Laboratory Psychology. Simple experiments providing illustrative material and training in the methods of laboratory psy-

\* This course is of special interest to students taking courses in fine arts.



- chology. (4 cred.; soph., jr., sr.; with or after elementary psychology; MTWThF VII, VIII, IX, and S III; 211Psy.) Kate Hevner.
- 104su. Psychology of Learning. A study of the literature and experiments in the field of memory and habit formation. Lectures, readings, and reports. (3 cred.; jr., sr., grad.; prereq., elementary psychology; MTWThFS II; 109Psy.) W. T. Heron.
- 107su. Vocational and Employment Psychology. Psychology of individual differences in intelligence, aptitudes, interests, and training, with special reference to vocational guidance and personnel methods in education and industry. (3 cred.; jr., sr., grad.; prereq., elementary psychology; MTWThFS II; 115Psy.) D. G. Paterson.
- 109su.<sup>1</sup> Psychology of Individual Differences. Experimental and statistical study of influence of sex, race, immediate ancestry, environment, and maturity, in causation of individual differences in mental traits. (3 cred.; jr., sr., grad.; prereq., elementary psychology; MTWThFS IV; 115Psy.) D. G. Paterson.
- 113su.<sup>1</sup> Abnormal Psychology. Normal and abnormal behavior contrasted. Varieties of maladjustment. Stress will be laid on the inadequacies of personality as shown in everyday life. (3 cred.; jr., sr., grad.; prereq., elementary psychology; MTWThFS IV; 109Psy.) Edna Heibredner.
- 171su. Research Problems in Applied Psychology. Permission of the instructor to elect this course must be secured. (2 cred.; jr., sr., grad.; permission of instructor required; prereq., advanced preparation; ar.; ar.) D. G. Paterson.
- 181su. Research Problems in General or Experimental Psychology. For students qualified for research work in experimental problems in general psychology through intensive work in the literature of the subject. Students will be guided through conferences, the hours to be arranged. (2 cred.; jr., sr., grad.; permission of instructor required; prereq., advanced preparation; ar.; ar.) C. Bird, Edna Heibredner, W. T. Heron.

## SECOND TERM

- 1su,2su. General Psychology. (See 1su, 2su above.) (6 cred.; soph., jr., sr.; no prereq.; Sec. 1, MTWThFS I-II; Sec. 2, MTWThFS III-IV.) W. G. McAllister, H. Carter.

NOTE—See lectures and round table conducted by visiting European psychologists listed under the Department of Educational Psychology in College of Education.

## ROMANCE LANGUAGES

## COURSES IN FRENCH

## FIRST TERM

- 1su. Beginning French. (4 cred.; all; no prereq.; MTWF III; TWThF IV; 201F.) Marguerite Guinotte.

<sup>1</sup> Does not count as equivalent of 6-credit course with same title in major sequences.

- 4su. Intermediate French. Reading of representative modern authors; review grammar, composition. May also be taken as equivalent to French 3 by students who have completed French 2 with a grade of C. (4 cred.; all; prereq., 3; TWThF I, II; 202F.) E. W. Olmsted, F. B. Barton.
- 26su.\* Survey of French Literature; 1600 to 1830. Satisfies the survey prereq. for all advanced courses in French literature. (5 cred.; all; prereq., 4 or permission of instructor; MTWThF I, II; 201F.) E. H. Sirich.
- 62su. Practical French Phonetics. (2 cred.; jr., sr.; prereq., 49 or permission of instructor; TWThF V; 201F.) Marguerite Guinotte.
- 106su. French Syntax. Discussion of characteristic problems of French syntax. Designed especially for teachers. (2 cred.; jr., sr., grad.; prereq., 63 or permission of instructor; TWThF II; 203F.) F. B. Barton.
- 157su. Eighteenth-Century Comedy. (2 cred.; jr., sr., grad.; prereq., 21-22-23 or permission of instructor; TWThF IV; 203F.) E. W. Olmsted.
- 159su.\* French Romantic Drama. (2 cred.; jr., sr., grad.; prereq., 21-22-23 or permission of instructor; MTWF III; 202F.) F. B. Barton.
- 167su. Parnassian Poets: Heredia, Baudelaire, Coppée, Prudhomme. (2 cred.; jr., sr., grad.; prereq., 21-22-23 or permission of instructor; TWThF I; 203F.) E. W. Olmsted.

#### SECOND TERM

- 163su. Victor Hugo. (4 cred.; jr., sr., grad.; prereq., 21-22-23 or permission of instructor; MTWF III, MTWTh IV; 203F.) I. C. LeCompte.
- 170su. History of French Language. (2 cred.; jr., sr., grad.; prereq., 21-22-23, or permission of instructor; TWThF II; 202F.) I. C. LeCompte.

#### SOCIOLOGY

##### FIRST TERM

- 1su. Introduction to Sociology. A study of the culture of the group. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; soph., jr., sr., and 3rd qtr. fr.; no prereq.; Sec. 1, MTWThFS I; Sec. 2, MTWThFS II; Sec. 3, MTWFS III, 1 hr. ar.; 104OPh.) W. D. Wallis, M. W. Willey, F. Harris, P. H. Landis.
- 6su. Social Interaction. An examination into the basis and forms of social interaction and social relationships, with detailed attention to some of the fundamental behavior patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq., Soc. 1; MTWThFS II; 109OPh.) R. W. Murchie.
- 14su. Rural Sociology. A study of rural and urban relationships. The principles of sociology applied to the position of an agricultural class in

\* These courses are of special interest to students taking courses in fine arts.

- an industrial society; the contributions and obligations of farmers to the larger society and vice versa. (3 cred.; soph., jr., sr.; prereq., Soc. I; MTWThFS IV; 104OPh.) F. Frey.
- 49su. The Occurrence of the Socially Inadequate. The significance of the socially inadequate in contemporary and industrial societies and the description of the methods used in their care. (3 cred.; 3rd qtr. soph., jr., sr.; prereq., 10 cred. in soc. or Soc. I and 10 cred. in soc. sci. or psy.; MTWFS III; 109OPh.) Anne L. Fenlason.
- 52su. Elementary Case Work. The methods of case work as applied to the treatment of the socially inadequate. (3 cred.; jr., sr.; prereq., 49; Soc. 90 must be taken simultaneously; MTWThFS IV; 109OPh.) Anne L. Fenlason.
- 53su. Elements of Criminology. The causes and treatment of crime from the point of view of processes of social interaction. (3 cred.; jr., sr.; prereq., same as for 49; MTWThFS I; 109OPh.) G. B. Vold.
- 90su. Elementary Field Work. Designed to give first-hand knowledge of the conditions out of which dependency develops, by field work with a social service agency. (2 cred.; jr., sr.; prereq., Soc. 49; ar.) Mildred D. Mudgett.
- 91su. Elementary Field Work. Designed for students who have taken 90 and aiming to give practice in the methods of treatment outlined in Course 52. (2 cred.; jr., sr.; prereq., 49 and 90; ar.) Mildred D. Mudgett.
- 92su. Elementary Field Work. Field work on special research problems, principally in the field of child welfare, depending upon the proficiency attained in 90 and 91. (2 cred.; jr., sr.; prereq., 49, 90, 91; ar.) Mildred D. Mudgett.
- 100su.\* Social Psychology. The social attitudes; their development and modification under social pressures; the interactions of individuals and groups. (3 cred.; jr., sr., grad.; prereq., Soc. 1, Psy. 1-2, and 11 cred. in soc. sci., ed., phil., and psy.; MTWThFS I; 101OPh.) R. W. Murchie.
- 101su. Social Organization. The organization and structure of social groups; the basic social processes of differentiation, stratification, and mobility. Integration and disintegration of social groups and institutions. Essentials of social dynamics. (3 cred.; jr., sr., grad.; prereq., 4 courses in soc., or Soc. I and 15 cred. in soc. sci., ed., phil., or psy.) MTWFS III; 101OPh.) P. Sorokin.
- 116su. The Newspaper As a Social Institution. A study of the social rôle of the newspaper in the United States with special reference to the social changes that have influenced the press, and the corresponding influences of the press upon social life. (3 cred.; jr., sr., grad.; prereq., same as for 101; MTWThFS II; 101OPh.) M. W. Willey.
- 141su. Contemporary Social Theory. Survey, analysis, and criticism of fundamental contemporary sociological theories and systems. (3 cred.;

\* This course is of special interest to students taking courses in fine arts.

jr., sr., grad.; prereq., same as for 101; MTWThFS IV; 101OPh.)  
P. Sorokin.

- 153-154-155su. Advanced Field Work. May be taken in specialized fields. Open to students wishing to strengthen their experience in case work. (3 cred.; jr., sr., grad.; prereq., 90, 91; ar.) Mildred D. Mudgett.
- 200su. Research Seminar. Research on special problems. Open only to graduates on approval of instructors. Offers the opportunity for investigation of special problems under supervision. Credit will be assigned according to the amount and quality of work done. (Grad.; ar.) Staff.

#### SECOND TERM

- 1su. Same as course given first term. (I, 109OPh; II, 104OPh.) Irene Barnes, E. D. Monachesi.
- 6su. Same as course given first term. (III; 104OPh.) G. A. Lundquist.
- 14su. Same as course given first term. (IV; 104OPh.) G. A. Lundquist.
- 90-91-92su. Same as course given first term. (Ar.) Mildred D. Mudgett.
- 120su. Social Progress. A history of the theories of progress and a critique of the idea of progress. (3 cred.; jr., sr., grad.; prereq., same as for 103; MTWThFS II; 109OPh.) W. D. Wallis.
- 122su. Methods of Social Investigation. The general nature of scientific methods and the application of these methods to the study of social phenomena. (3 cred.; jr., sr., grad.; prereq., same as for 103; MTWThFS IV; 109OPh.) E. H. Sutherland.
- 153-154-155su. Same as course given first term. (Ar.) Mildred D. Mudgett.
- 161su. Crime and Punishment As Social Conflict. Crime and punishment as adjustments to conflict situations. (3 cred.; jr., sr., grad.; prereq., same as for 101; MTWFS III; 109OPh.) E. H. Sutherland.
- 200su. Research Seminar. Same as first term. Staff.

#### SPEECH

##### FIRST TERM

- General Conference Period. A semi-weekly conference for the consideration of voice and behavior problems. Lectures and demonstrations. Attendance required of beginning students and expected of others.
- Speech Clinic. For students who have particular speech defects such as cleft palate, stuttering, lisp, and inadequate social behavior. (410F.) B. Bryngelson.
- 41su.<sup>1</sup> Fundamentals of Speech. Elements of the speech problem and of effective public speaking. This course carries university credit for the first quarter of Speech 41-42-43. (3 cred.; soph., jr., sr.; prereq., Eng. A-B-C or Comp. 1-2-3 or 4-5-6; Sec. 1, MTWThFS I; 301F; Sec. 2, MTWThF VI and 1 hr. ar.; 212F.) Sec. 1, Verna Steel; Sec. 2, F. L. D. Holmes.

<sup>1</sup> Students taking these courses are required to pay a laboratory fee of \$1.

- 55su. Argumentation and Debate. Short course for teachers. Theory and practice of argumentation. Phrasing debatable propositions. Analysis, evidence, reasoning. Practice debating. Problems of coaching. Sources of materials. This course carries university credit for the first quarter of Speech 55-56-57. (3 cred.; jr., sr.; prereq., 41-42-43; MTWThFS II; 308F.) W. Morse.
- 61su. Correction of Speech Disorders. An introduction to speech correction, mental hygiene, and speech education. Speech defects as symptoms of maladjustment and organic malformation. Case histories presented. Vocal mechanism. Examination of the literature in the field. (3 cred.; jr., sr.; no prereq.; MTWThFS II; 212F.) B. Bryngelson.
- 67su.<sup>1</sup> Phonetics. The study of English speech sounds, as they occur separately and in connected speech. Strong and weak forms, stress, assimilation. Practice in ear training. (3 cred.; jr., sr.; prereq., 41-42-43 or 45-46; MTWThF VIII and 1 hr. ar.; 308F.) J. F. Smith.
- 71su.<sup>1</sup> Elements of Play Production. A study of the history of the theater, of the elementary principles of acting, of make-up, of the physical stage and its terms, of the organization of work on a production, of the use of stage equipment. Participation in one-act plays, and reading of plays required. (3 cred.; prereq., 41-42-43 or 45-46; MTWThFS IV; 19Mu.) J. F. Smith.
- 81su.\* Interpretative Reading. The interpretation and oral reading of the various forms of literature, such as prose narrative, lyric and narrative poetry, the essay, and the drama. This course carries university credit for the first quarter of Speech 81-82-83. (3 cred.; jr., sr.; prereq., 41-42-43 or 45-46; MTWThFS I; 308F.) F. M. Rarig.
- 91su.\* Stagecraft and Direction. A study of dramatic production from the standpoint of the student going out to teach dramatics. The choice of a play, adaptation of the equipment at hand, building up equipment, organization, conduct of rehearsals, translating the play into action, symbolism of position, movement and grouping, producing without scenery, producing with scenery and lights. Direction and analysis of one-act plays required. This course carries university credit for the first quarter of Speech 91-92-93. (3 cred.; jr., sr.; prereq., Eng. 55-56, Speech 81-82-83; MTWThF VII and 1 hr. ar.; 19Mu.) E. Staadt.
- 105su.\* Theory of Reading and Acting. The forms of literature; literature regarded as an art; psychology of creative imagination; speech elements in literature; technique governing use of auditory and visual symbols. Collateral readings, speech problems, reports, term papers. This course carries university credit for Speech 105s. (3 cred.; jr., sr., grad.; prereq., 41-42-43 or 45-46 and 81-82-83; MTWFS III, 1 hr. ar.; 308F.) F. M. Rarig.
- 121su.<sup>1</sup> Advanced Speech Problems. Factors determining the behavior of speakers and audiences. This course carries university credit for

<sup>1</sup> Students taking these courses are required to pay a laboratory fee of \$1.

\* These courses are of special interest to students taking courses in fine arts.

Speech 121w. (3 cred.; jr., sr., grad.; prereq., 41-42-43 or 45-46 and Psy. 1-2; MTWThFS I; 409F.) W. Morse.

162su<sup>1</sup> Advanced Speech Correction. Physiology of the speech mechanism. Theories of stuttering examined and evaluated. Practice in taking case histories, making diagnoses, and treating cases. Application of emotional and intelligence tests to speech cases. The laboratory work, consisting of case studies, is done under the supervision of the Speech Clinic. (3 cred.; jr., sr., grad.; prereq., Speech 41-42-43 or 45-46 and Speech 61; lect. MWFS IV, lab. and clinic TTh VI; 406F.) B. Bryngelson.

#### SECOND TERM

41su.<sup>1</sup> Fundamentals of Speech. Elements of the speech problem and of effective public speaking. This course carries university credit for the first quarter of Speech 41-42-43. (3 cred.; soph., jr., sr.; prereq., Eng. A-B-C or Comp. 1-2-3 or 4-5-6; MTWThFS II; 308F.) W. Morse.

42su.<sup>1</sup> Fundamentals of Speech. A continuation of 41. This course carries university credit for the second quarter of Speech 41-42-43. (3 cred.; soph., jr., sr.; prereq., 41; MTWThFS IV; 301F.) F. Knower.

43su.<sup>1</sup> Fundamentals of Speech. A continuation of 42. This course carries university credit for the third quarter of Speech 41-42-43. (3 cred.; soph., jr., sr.; prereq., 41-42; MTWThFS I; 308F.) F. Knower.

51su.<sup>1</sup> Advanced Public Speaking. Preparation and delivery of speeches on public questions. Methods of outlining and of reasoning. Elementary research; handling material before an audience. Technique of body and voice. (3 cred.; prereq., 41-42-43 or 45-46; MTWThFS IV; 308F.) W. Morse.

#### ZOOLOGY

Credit is given for acceptable work done at any accredited marine or freshwater biological station.

#### FIRST TERM

1su.<sup>2</sup> General Zoology. A survey of the animal kingdom, emphasizing the principles of morphology, physiology, embryology, heredity, classification, and evolution of animals. Textbook, lectures, quizzes, and laboratory. (5 cred.; all; no prereq.; lect., MTWThF I, IV; 211Z; lab., MTWThF II, III; 101Z.) E. P. Churchill, J. A. Cederstrom.

23su.<sup>3</sup> Introductory Entomology. A study of the morphology and general classification of insects. Methods of collecting and preservation of insects will be considered and each student will be expected to prepare a representative, determined collection. Lectures, laboratory, and field

<sup>1</sup> Students taking these courses are required to pay a laboratory fee of \$1.

<sup>2</sup> A laboratory fee of \$2 is charged for this course.

<sup>3</sup> A laboratory fee of \$1.50 is charged for this course.

- work. (5 cred.; prereq., general zoology or biology; MTWThF VI-IX; 208Z.) R. T. King.
- 25su.<sup>2</sup> Introductory Histology. A brief course on the structure of the cell, tissues, and organs. Lectures, laboratory. (5 cred.; soph., jr., sr.; prereq., 1-2; MTWThFS I-IV; 201Z.) A. R. Ringoen.
- 117su. General Ecology. General ecology with special reference to the insects of Minnesota. Frequent field trips. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; prereq., 1-2 and 5 additional hours in Zoology, or equivalent; MWF VI-IX and ar.; 208Z.) R. T. King.
- 181su.<sup>2</sup> Comparative Embryology. A survey of the principles of animal development dealing with fundamental invertebrate and vertebrate types. Lectures, reference, and laboratory work. (3 cred.; jr., sr., grad.; prereq., 1-2 and 25 or equiv.; MTWFS III-IV and ar.; 202Z.) A. R. Ringoen.
- 183su. Genetics and Eugenics. Facts and theories of heredity and application to man. Textbook, lectures and demonstrations. (3 cred.; jr., sr., grad.; prereq., 15 hrs. in zoology or equiv.; MTWThFS II, 211Z.) J. E. Wodsedalek.
- 197su. Problems. Opportunity will be afforded for individual work in comparative embryology, entomology, or animal parasitology. Conferences, laboratory, and library work, leading to thesis problems. (3 or more credits; jr., sr., grad.; prereq., 20 cred. in zoology or its equivalent; ar.; not less than 18 actual hours per week.) W. A. Riley, J. E. Wodsedalek, A. R. Ringoen.

## SECOND TERM

- 2su.<sup>1</sup> General Zoology. A continuation of Course 1su. (5 cred.; all.; prereq., 1su or its equivalent; lect., MTWThF I, IV; 211Z; lab., MTWThF II, III; 101Z.) A. R. Ringoen, J. A. Cederstrom.
- 182su.<sup>2</sup> Comparative Embryology. A continuation of Course 181su. (3 cred.; jr., sr., grad.; prereq., 181su or equivalent; MWF ar.) A. R. Ringoen.
- 198su. Problems. In special cases, arrangements may be made for the continuation of problems begun during the first term. (3 cred. or more cred.; not less than 18 actual hours per week.) W. A. Riley, A. R. Ringoen.

<sup>1</sup> A laboratory fee of \$2 is charged for this course.

<sup>2</sup> A laboratory fee of \$1.50 per credit is charged for this course.

COLLEGE OF ENGINEERING AND ARCHITECTURE  
ARCHITECTURE

FIRST TERM

A SPECIAL PROGRAM OF FINE ARTS lectures and demonstrations will be held during the first term of the Summer Session, 1929, including sculpture, painting, decoration, and the history and appreciation of art. Several artists of international note will be brought to the University in connection with this program. A special announcement devoted to this work will be available on application. Courses marked with an asterisk (\*) are offered in this series.

- 21-22-23su. Beginning Freehand Drawing. Perspective sketching. Drawing in pencil and charcoal. (2 cred.; no prereq. for 21; 22 and 23 are continuations for arch. students; MTWTh I-II or III-IV; 417E.) E. E. Young.
- 24-25-26su. Intermediate Freehand Drawing in Water Color and Other Media. Sketching out of doors. (2 cred.; prereq. for 24, evidence of intermediate ability; 25 and 26 are continuations for arch. students; MTWTh I-II or III-IV; 417E.) E. E. Young.
- 27-28-29su. Advanced Freehand Drawing. Still life, antique, head from life, and sketching out of doors. (2 cred.; prereq. for 27, evidence of advanced ability; 28 and 29 are continuations for arch. students; MTWTh I-II or III-IV; 417E.) E. E. Young.
- 31su. Elements of Architecture. Exercises in instrumental drawing and architectural lettering. Theory and practice of wash rendering. Library research. (5 cred.; fr. arch.; no prereq.; MTWThF I-IV; 317E.) D. C. Heath.
- 32su. Elements of Architecture. Original problems in the architectural treatment of walls, floors, windows, and moldings. Lectures and library research. (5 cred.; fr. arch.; prereq., 31; MTWThF I-IV; 317E.) D. C. Heath.
- 33su. Elements of Architecture. Study of the elements, forms, and principles of architecture. Original problems in their use in elementary architectural design. Lectures and library research. (5 cred.; fr. arch., prereq., 32; MTWThF I-IV or ar.; 317E.) D. C. Heath.
- 34-35-36su. Architectural Design, Grade I. Long and short problems done under individual criticism dealing in general with the elements of plan and elevation. Sketch problems dealing with the simple compositions. (2 or 4 cred.; prereq., Arch. 33; MTWThFS I-IV or ar.; 317E.) D. C. Heath.
- \*40su. Painting. Still life, head and figure, landscape. (3 or 6 cred.; prereq., evidence of elementary ability; MWF V-VII; 405E.) E. E. Young.
- \*41su. Sculpture. Modeling in clay. Head, figure, and composition. (3 or 6 cred.; prereq., evidence of elementary ability; MWF I-III; 405E.) S. C. Burton.



- \*180su. Architecture and Decoration. History and appreciation of interior architecture, furniture, and decoration. Illustrated lectures and research. (2 cred.; no prereq.; TWF IV.) (Minimum of fifteen students.) F. M. Mann.

## CIVIL ENGINEERING

### STRUCTURAL ENGINEERING

#### FIRST TERM

- 131su. Bridge Analysis. Stresses in simple span railway bridge trusses of the larger type. Baltimore, Petit, Whipple, and "K" trusses. (3 cred.; sr. C.E.; prereq., C.E. 134; ar.; 227E.) J. A. Wise.
- 132su. Bridge Design. Design and detail drawing of railway plate girder viaduct. (3 cred.; sr. C.E.; prereq., C.E. 131; ar.; 227E.) J. A. Wise.
- 134su. Statically Indeterminate Structures. General theory of deflections and statically indeterminate stresses and their application to continuous girders, frames, swinging bridges, and redundant members. (3 cred.; sr. C.E.; prereq., C.E. 33 and M. and M. 128; ar.; 227 E.) J. A. Wise.

## DRAWING AND DESCRIPTIVE GEOMETRY

#### FIRST TERM

- 1su. Engineering Drawing. The elements of drafting including an introductory course in the methods of representation and constructive geometry. Graphs and formulas. Sketching, lettering, working drawings, conventions, standards, tracing, and blue printing. (3 cred.; all; prereq., solid geom.; 2 lect., 16 hrs. lab.; ar.; 101E.) H. C. T. Eggers.
- 2su. Engineering Drawing. A continuation of Course 1. (3 cred.; all; prereq., Dr. 1; 2 lect., 16 hrs. lab.; ar.; 101E.) H. C. T. Eggers.
- 3su. Descriptive Geometry. An elementary course in the methods of representation, correlated in part with analytical geometry. Graphical and algebraic solutions. Lectures, demonstrations, and drawing room exercises. (3 cred.; prereq., Dr. 2, Math. 12; lect., TWThF I; 205E; lab., 14 hrs.; ar.; 101E.) H. C. T. Eggers.
- 4-5-6su. Engineering Drawing and Descriptive Geometry. The elements of drafting. Descriptive geometry including graphical methods of representation, correlated in part with analytical geometry. Required of freshmen in chemistry and chemical engineering who satisfy the entrance requirements in mathematics. (2 cred. each; prereq., sol. geom.; ar.; 201E.) H. C. T. Eggers.
- 7-8su. Engineering Drawing and Descriptive Geometry. (Chem. and Chem E.) (3 cred. per qtr.; prereq., solid geometry.) H. C. T. Eggers.
- 10su. Solid Geometry. Lines and planes in space; dihedral and polyhedral angles; polyhedrons, surfaces, cylinders, cones, spheres. Numerical exercises in area, volumes, weights. Entrance credit for the College of Engineering and Architecture. (3 cred.; prereq., plane geometry, open also to teachers; 5 hrs. per week; MTWThF I; 203E.) R. W. French.

- 21su. Drafting. (C.E.) Drawing of structures and machines. Details, assembly, and construction drawings. The solution of problems of simple structures. The application of descriptive geometry to drafting room problems. (2 cred.; soph. C.E.; prereq., Dr. 3; 12 hrs.; ar.; 201E.) R. W. French.
- 22su. Drafting. (C.E.) Continuation of Course 21. Drafting problems in concrete, highway, and topographical work as met by the civil engineering draftsman in practice. Intersections, developments, and other practical geometric problems. (2 cred.; soph. C.E.; prereq., Dr. 21; 12 hrs.; ar.; 201E.) R. W. French.
- 23su. Drafting. (C.E.) A continuation of Course 22. (2 cred.; soph. C.E.; prereq., Dr. 22; 12 hrs.; ar.; 201E.) R. W. French.
- 26su. Drafting (E.E.) The application of descriptive geometry to drafting room problems. Working drawings and tracing. (2 cred.; soph. E.E.; prereq., Dr. 3; 12 hrs.; ar.; 201E.) R. W. French.
- 27su. Drafting. (E.E.) The application of elementary formulas in the proportioning of simple machine parts. Outline and assembly drawings, electrical conventions, circuit diagrams, the development of simple formulas, and graphical methods. (2 cred.; soph. E.E.; prereq., Dr. 26; 12 hrs.; ar.; 201E.) H. C. T. Eggers.
- 28su. Drafting. (M.E.) The application of descriptive geometry to drafting room problems. Working drawings and tracing. (2 cred.; soph. M.E.; prereq., Dr. 3; 12 hrs.; ar.; 201E.) R. W. French.
- 29su. Drafting. (M.E.) The application of elementary formulas in the proportioning of simple machine parts. Outline and assembly drawings, structural drafting, the development of simple formulas, and graphical methods. (2 cred.; soph. M.E.; prereq., Dr. 28; 12 hrs.; ar.; 201E.) H. C. T. Eggers.

## SECOND TERM

- 3su. Descriptive Geometry. See statement for first term. Hours arranged. R. F. Schuck.
- 6su. Descriptive Geometry. (Chem. and Chem.E.) See statement for first term. R. F. Schuck.
- 8su. Drawing and Descriptive Geometry. (Chem. and Chem.E.) See statement for first term. R. F. Schuck.
- 21su. Drafting. (C.E.) See statement for first term. R. F. Schuck.
- 26su. Drafting. (E.E.) See statement for first term. R. F. Schuck.
- 27su. Drafting. (E.E.) See statement for first term. R. F. Schuck.
- 28su. Drafting. (M.E.) See statement for first term. R. F. Schuck.
- 29su. Drafting. (M.E.) See statement for first term. R. F. Schuck.

## MATHEMATICS AND MECHANICS

127, Dynamics, 5 credits; or 129, Hydraulics, 4 credits, may be given in either term of the Summer Session, provided a sufficient number of students petition for it and pay their fees at least one week before the beginning of the session.

## FIRST TERM

- 9su. Higher Algebra. (High school.) (See Mathematics 5, College of Science, Literature, and the Arts, page 47.)
- 10su. Solid Geometry. (See Drawing and Descriptive Geometry, page 62.)
- 11su. College Algebra. (See Mathematics 7, College of Science, Literature, and the Arts, page 47.)
- 12su. Trigonometry. (See Mathematics 6, College of Science, Literature, and the Arts, page 47.)
- 13su. Analytical Geometry. Co-ordinate systems, equation, locus, straight line, second degree equations, polar co-ordinates, parametric equations, derivatives, tangents, normals, conic sections, rotation of axes, empirical equations. Space co-ordinates, plane, line, quadric surfaces, cylinders, space curves, tangent lines, planes. (5 cred.; fr. eng., arch., chem.; prereq., 12; MTWF III, IV; Th IV, V 205E.) C. Boehnlein.
- 25su. Integral Calculus. Standard elementary forms, definite integral, rational fractions, integration by substitution, integration by parts, reduction formulas, integration a process of summation, successive and partial integrations, elementary ordinary differential equations. (5 cred.; soph. eng.; prereq., 24; MTWF III, IV; Th IV, V 136E.) H. H. Dalaker.
- 26su. Technical Mechanics. *Statics*. Characteristics of a force, parallelogram law, moments, couples resultant of a force system, equilibrium of a force system, friction, centroids catenary. (5 cred.; soph. eng.; prereq., 25; MTWF III, IV; Th IV, V 106E.) C. A. Herrick.

NOTE.—Courses 26 and 127 (total 10 credits) may be taken by chemists and chemical engineers as a substitute for Course 84 (5 credits) or by architects as a substitute for Course 92 (4 credits).

- 128su. 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; MTWF III-IV; Th IV-V; 215E.) F. E. Miller. (Subject to sufficient advance registration and fees.)
- 141su. Materials Testing Laboratory. Investigation of the physical properties of various metals and engineering materials (wood, cement, ropes, etc.). Standard methods of testing. (2 cred.; prereq., 128 or reg. in 128; 4 hrs.; ar.) F. E. Miller. (Subject to sufficient advance registration and fees.)

NOTE.—Courses 128 and 141 (7 credits) may be taken as a substitute for Course 85 (4 credits) by chemical and agricultural engineers. Course 128 may be taken by architects as a substitute for Course 93 (4 credits).

## SECOND TERM

- 13su. Analytical Geometry. See statement for first term. (5 cred.; fr. eng., arch., chem.; prereq., 12; MTWThF III-IV; 136E.) G. C. Priester.
- 26su. Technical Mechanics. *Statics*. See statement for first term. (5 cred.; soph. eng.; prereq., 25; MTWThF III-IV; 205E.) H. B. Wilcox.

## MECHANICAL ENGINEERING\*

## FIRST TERM

## WOODWORKING COURSES

11su.<sup>1</sup> Pattern Practice for Engineering Students and Others. Construction and demonstration of various types of patterns used in the production of castings. Study of shop drawings, materials used, operation of woodworking tools and machinery. Inspection trips and reports. (2 cred.; fr. eng.; no prereq.; M I-IX, TWF I-IV, Th I-II; ME.) W. H. Richards.

*Special Courses for Teachers*

- 16su.<sup>1</sup> Machine Woodworking. Operation and setting up of woodworking machinery; care and manipulation of adjustable parts. Layout and plan of course and equipment for high school or junior college, including problems in cabinet making and wood construction. (2 to 4 cred.; no prereq.; M I-X, TWFS I-IV, Th I-II; ME.) W. H. Richards.
- 4su.<sup>1</sup> Wood Turning. Operation and adjustment of the lathe; care and manipulation of wood turning hand tools. Turning between centers, face plate, and chuck work. Plan and arrangement of projects suitable for a high school course. (2 to 4 cred.; no prereq.; M I-IX, TWFS I-IV, Th I-II; ME.) W. H. Richards.
- 5su.<sup>1</sup> Wood Finishing. Preparatory treatment of wood surfaces, color mixing, application of oil and acid stains, shellacking, varnishing, enameling, rubbing, and finishing. Polychrome projects, layout, building up of design, application and blending of colors. (2 to 4 cred.; no prereq.; M I-IX, TWFS I-IV, Th I-II; ME.) W. H. Richards.
- 6su.<sup>1</sup> Pattern Practice. Pattern layout. Partings, draft, shrinkage and finish allowance. Building and assembly of materials, core prints and core boxes, color symbols. The relation of pattern and foundry practice. Industrial problems and methods, lectures and notes. (2 to 4 cred.; no prereq.; M I-X, TWFS I-IV, Th I-II; ME.) W. H. Richards.
- 20su.<sup>2</sup> Furniture Making. Details of designs and construction. Doweling, mortise and tenon work. Bending and setting of shapers. Value and materials used in built-up work. Laying of veneers. Layout of a course in high school furniture making. (2 to 4 cred.; no prereq.; M I-IX, TWFS I-IV, Th I-II; ME.) W. H. Richards.

## MACHINE SHOP WORK

14su.<sup>1</sup> Machine Shop Practice for Mechanical Engineering Students. Care and operation of machine tools. Bench work, lathe, planer, shaper, and drill press work including screw thread cutting, taper turning, gear cutting, precision grinding, etc. 12 lectures, shop inspection trips. (3 cred.; soph. mech.; no prereq.; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.

<sup>1</sup> A laboratory fee of \$1.50 per credit is charged for this course.

\* The shops are open at the hours stated. The student will arrange his program with the instructor.

- 15su.<sup>1</sup> Advanced Machine Shop Practice for Mechanical Engineering Students. Machine shop production methods and manufacturing principles. Practice in the manufacturing of a small gasoline marine motor on production basis; also heat treatment, welding, and brazing. (3 cred.; soph. mech.; prereq., 14; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.
- 16su.<sup>1</sup> Elementary Machine Shop for Electrical Engineering Students. Bench work, lathe, planer, shaper, drill press, and milling machine operation. (2 cred.; soph. elec.; no prereq.; M I-IX; TWFS; I-IV; Th I-II; ME.) D. A. Rogers.
- 17su.<sup>1</sup> Machine Shop Practice. (Chemists and chemical engineers.) (2 cred.; no prereq.; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.

*Special Courses for Teachers*

- 2su.<sup>1</sup> Bench Work. Bench and vise work in metal chipping, filing, scraping, fitting, polishing, and layout practice; planning of courses of study for school work. (2 cred.; no prereq.; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.
- 3su.<sup>1</sup> Elementary Machine Shop Practice. Lathe, shaper, planer, and drill press manipulation; the grinding, care, and kinds of cutting tools. Layout of courses and exercises for high school courses. This course can be arranged to include part of 2su. (2-4 cred.; no prereq.; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.
- 7su.<sup>1</sup> Advanced Machine Shop. Advanced lathe work, milling machine operation. Production work. Gear calculation, and cutting. Precision grinding. Layout of typical course. (2-4 cred.; prereq., 3; M I-IX; TWFS I-IV; Th I-II; ME.) D. A. Rogers.
- 114su.<sup>1</sup> General Metal Work. Special arrangements for individual needs. Care and use of metal working tools, including lathe, planer, shaper, milling machine, drill press, and automatic screw machine. Gears, screw threads, and milling cutters. Arrangements may be made for precision grinding, gear cutting, tool making, heat treatment, and acetylene welding. Planning equipment and projects for a high school course. (2-4 cred.; no prereq.; ar.) D. A. Rogers.

<sup>1</sup> A laboratory fee of \$1.50 per credit is charged for this course.

# THE COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

## GENERAL INFORMATION

Through the Summer Session the field plots, orchards, livestock libraries, laboratories, museums, shops, machinery, classrooms, instruction, and other facilities used by students during the regular college year are made available to those who attend during the summer months.

The work offered in agriculture and home economics seeks to meet the needs of graduates of arts 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 course and thesis work may be carried for the entire quarter. In a number of other divisions thesis work only may be pursued through the summer quarter. 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.

## ADMISSION

The undergraduate courses of the Summer Session are open to all mature men and women who are considered qualified to pursue the chosen work to advantage, but college credit will be given only when college entrance requirements have been fulfilled.

Graduates of the School of Agriculture of the University of Minnesota who have completed the two summers of supervised work offered in the school course, one additional school year, and one additional summer's work, or the equivalent thereof, will be admitted to the College of Agriculture, Forestry, and Home Economics.

For details of admission requirements and definition of "unit" see the bulletin of general information.

## CONSOLIDATED SCHOOL PRINCIPALS

In small schools the superintendent or principal may act as special teacher of agriculture by fulfilling the requirements established by the State Board. These include the regular qualifications for a teacher of agriculture and also the qualifications for superintendent or principal.

The Summer Session of the University offers opportunity to take courses preparatory for the fulfillment of these requirements.

## SPECIAL THREE-WEEK COURSES FOR AGRICULTURE TEACHERS

By special arrangement four courses of three credits each have been divided into halves, A and B, each of three weeks' duration and each carrying  $1\frac{1}{2}$  credits. The maximum student load of these half courses during the three weeks' period is three  $1\frac{1}{2}$  credit courses.

The four courses offered in the summer, 1929, under these conditions, are:

Agricultural Education 161Asu. (See page 101.)

Agricultural Education 231Asu. (See page 101.)

Agronomy 125Asu. (See page 69.)

Dairy Husbandry 115Asu. (See page 70.)

These four courses will be offered during the first three weeks of the first term, June 18 to July 10. Credit in each of these "A" courses will be suspended until the student finishes the "B" portions of the same course. The "B" portions will be offered some time later. These four courses are scheduled to avoid conflicts with each other so any student may take any three of them.

## AGRICULTURAL BIOCHEMISTRY

## FIRST TERM

- 3-4su. Types of Carbon Compounds. An elementary study of the different groups of carbon compounds, with special reference to their relationships and their occurrence in plant and animal materials used as food. (6 cred.; soph., jr., sr.; prereq., 1 yr. chem.; MTWThFS I, II; 113BCh.) C. F. Rogers.
- 111su. Biochemistry. An advanced course dealing with the colloidal state, and the chemistry of proteins, carbohydrates, glucosides, tannins, fats, plant acids, enzymes, and pigments and their physicochemical relations to vital processes. (3 cred.; jr., sr., grad.; prereq., biol., 9 cred., org. chem.; lect., MWF I, II; 115BCh.) W. M. Sandstrom.
- 113su.<sup>2</sup> Biochemical Laboratory Methods. A laboratory course paralleling the lecture in 111-112. (2 cred.; jr., sr., grad.; prereq., quant. anal., parallel 111; MWF III, IV, TTh I-IV; 203BCh.) W. M. Sandstrom and assistant.
- 203asu.<sup>1</sup> Research Problems. Special work on particular research problems other than the student's major thesis. Facilities are provided for bio-

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

chemical investigations and for advanced studies in plant, animal, or human nutrition ( $1\frac{1}{2}$  or  $2\frac{1}{2}$  cred.; grad.; ar.) R. A. Gortner, C. H. Bailey, L. S. Palmer.

SECOND TERM

- 112su. Biochemistry. A continuation of Course 111su. (3 cred.; jr., sr., grad.; prereq., 111; lect., MWF I, II; 115BCh.) W. M. Sandstrom.
- 114su.<sup>1</sup> Biochemical Laboratory Methods. A continuation of Course 113. (2 cred.; jr., sr., grad.; prereq., 113; MWF III, IV, TTh I, II, III, IV, 203BCh.) W. H. Sandstrom and assistant.
- 203bsu.<sup>2</sup> Research Problems. Second part of Course 203asu. ( $1\frac{1}{2}$  or  $2\frac{1}{2}$  cred.; grad.; prereq., 203a; ar.) R. A. Gortner, C. H. Bailey, L. S. Palmer.

AGRONOMY AND PLANT GENETICS

FIRST TERM

AGRONOMY

- 125Asu. Advanced Farm Crops. The important phases of crop production in the light of modern scientific knowledge. Studies of the important agricultural crops with emphasis as follows: ecology in relation to crop distribution and adaptation, physiology of crop production and plant nutrition, anatomy of the plant as related to growth responses, environmental factors as diseases, insects, etc., tillage practices, maintenance of soil productivity, and methods of plant improvement through plant breeding. (3 cred.; prereq., Bot. 127, 142, or 143, and Soils 4, 5; ar. See page 68.) H. K. Wilson.

FIRST AND SECOND TERMS

AGRONOMY

- 204su. The History and Classification of Crop Plants. Assignments, discussions, and laboratory work covering (a) the historical, botanical, and geographical origin of crop plants, and (b) a study of the characteristics of species and varieties of crop plants which is useful in identification and systematic classification. (3 cred.; prereq., Bot. 113 or 114, or 115 and Agron. 121.) H. K. Wilson.

PLANT GENETICS

- 241su. Research in Plant Genetics. Special problems in plant breeding, inheritance of plant characters, and cytological studies in relation to plant genetics. May be taken as major or minor work. (Ar.) H. K. Hayes, H. E. Brewbaker.
- 244su. Laboratory Problems in Plant Breeding. Supplementing 243f. Practice in plant breeding technique, methods of controlling pollination, and handling of plant culture. (3 cred.; ar.) H. E. Brewbaker.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.



## SUMMER SESSION

## DAIRY HUSBANDRY

## FIRST TERM

- 115Asu. Problems in Dairy Husbandry. A study of special problems in dairy feeding, selection, and management for the teacher and extension worker. (1½ cred.; prereq., 1, 101, one year's experience as high school teacher, county agent, or extension specialist; MTWThFS I; 3 weeks; 100HH. See page 68.) W. E. Petersen.
- 208su. Research in Dairy Husbandry. Facilities offered for study and investigation of subjects pertaining to dairy cattle. Students are allowed to assist at times with investigations under way in the experiment station. Arranged to meet the needs of individual students. Open in Summer Session only to students who have had preliminary graduate work. W. B. Combs.
- 209su. Research in Dairy Products. Opportunity and facilities are offered for study and investigation of problems concerning common dairy products. The work is arranged to meet the needs of the individual student. Open in Summer Session only to students who have had preliminary graduate work. W. B. Combs.

## SECOND TERM

- 210su. Research in Dairy Husbandry. Continuation of 208su. C. H. Eckles.
- 211su. Research in Dairy Products. Continuation of 209su. C. H. Eckles.

## ENTOMOLOGY AND ECONOMIC ZOOLOGY

## FIRST AND SECOND TERMS

- 120su. Advanced Insect Ecology. Special field work in terrestrial insects. Lectures, laboratory, assigned reading. (5 cred.; jr., sr., grad.; prereq., 15 cred. in zoology and ecology; ar.; 401Z.) R. N. Chapman.
- 197su. Introduction to Research. Preparation for investigational work in lines of entomology and parasitology. Advanced laboratory, field, and library work; training in the preparation of bibliographies and manuscripts; special problems. The following lines of work are open:
- Systematic Entomology. C. E. Mickel.
  - General Economic Entomology. A. G. Ruggles.
  - Insect Ecology. R. N. Chapman.
  - Insecticides. A. L. Strand.
- (2½ or more cred.; sr.; prereq., 37-38-39 or 44, 45, and other prescribed work; ar.)
- 204su. Research in Entomology. Ample opportunity for research work in various phases of entomology and parasitology will be afforded properly qualified students. This work will be individual and it is advised that students planning to undertake special problems correspond with the division relative to methods of collection and preparation of material. (3 or more cred.; prereq., ar.) R. N. Chapman, W. A. Riley, C. E. Mickel, A. L. Strand.

See announcement of the Department of Zoology for the following courses:

23su.<sup>1</sup> Introductory Entomology.

117su. General Ecology.

## FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

### FIRST TERM

Ag.Econ. 110su. Economics of Agricultural Production. Problems of agricultural production analyzed in terms of the principles of production economics. (3 cred.; jr., sr., grad.; prereq., Ag.Econ. 2; MTWThFS III; 312HH.) A. G. Black.

Ag.Econ. 140su. Principles of Marketing Organization. An expansion of the principles of production and price economics in terms of marketing activity. (3 cred.; jr., sr., grad.; prereq., Ag.Econ. 1; MTWThFS IV; 312HH.) O. B. Jesness, R. W. Cox.

### SECOND TERM

Ag.Econ. 104su. Types of Farming. A study of types of farming and of prevailing farm practices in the principal agricultural production areas. (3 cred.; jr., sr., grad.; prereq., Ag.Econ. 102 and 103, or equivalent; MTWThFS III; 312HH.) L. F. Gary.

Ag.Econ. 144su. Co-operative Organization. The principles of agricultural co-operation as exemplified by marketing organizations. Attention given to types of organization, pooling, contracts, membership relations, price policies, monopolistic possibilities, and related questions. (3 cred.; jr., sr., grad.; prereq., Ag.Econ. 140 or equivalent. MTWThFS IV; 312HH.) O. B. Jesness.

## FORESTRY

### COURSES AT ITASCA PARK

Bot. 3su. Forest Botany. (1½ cred.)

For. 2su. Field Dendrology. (1½ cred.)

For. 5su. Field Silviculture. (1½ cred.)

For. 9su. Field Mensuration. (1½ cred.)

## HOME ECONOMICS

### FIRST TERM

#### UNDERGRADUATE COURSES

H.E. 4su.<sup>1</sup> Textiles. The structure, processes of manufacture, and uses of fabrics. Art and economic considerations in selection and purchase of materials for clothing and household furnishings. (3 cred.; no prereq.; MTWFS III, IV, 2 hrs. ar.; 307HE.) (Limited to 24.) Ethel L. Phelps.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

- H.E. 53su.\* Advanced Design. Principles discussed and problems worked out relating to costume and house furnishing design. (3 cred.; soph., jr., sr.; prereq., 51 or 56; MTWThFS I, II; 114HE.) (Limited to 20.) Vetta Goldstein.
- H.E. 57su.\* Batik and Other Crafts. Principles of design and color harmony applied to batik and such other crafts as leather tooling, tie dyeing, and lamp shade making. Articles are planned to relate to definite dress and home furnishing problems. (3 cred.; prereq., 3, 53 or parallel; MTWFS III, IV, 2 hrs. ar.; 110HE.) (Limited to 20.) Vetta Goldstein.
- H.E. 61su. Quantity Cookery. Application of the principles of cookery to large quantity preparation; planning of meals for dining hall, cafeteria and tearoom; a study of standardized formulae and production costs. (4 cred.; 3 qtr. soph., jr., sr.; prereq., 83; MTWF I, II, III; DiH.) (Limited to 15.) Frances Dunning.
- H.E. 85su.<sup>1</sup> Food Marketing. Food Problems of the Consumer. A study of the quality and cost of foods on the market. Laboratory and field work. (2 cred.; prereq., Ag.Econ. 1 or parallel; WF VI, VII; 207HE.) Kathryn B. Niles.

## GRADUATE COURSES

- H.E. 102su.<sup>1</sup> Advanced Textiles. An intensive study of textile materials with special reference to the following: nature of the raw materials; economic, chemical, and physical applications involved in their manufacture and use; methods and significance of physical testing. (3 cred.; jr., sr.; prereq., 3, Agr. Biochemistry 3-4, Ag.Econ. 1 or parallel; MTThF VI, VII, VIII; 307HE.) Ethel L. Phelps.
- H.E. 134su. Home Management Problems. A consideration of the economic and social problems of the management of the home including a study of foods management, clothing management, planning for housing, financial management, home and community relationship. (3 cred.; jr., sr.; prereq., 34 or equivalent; MTWFS IV, 1 hr. ar.; 203HE.) Lucy A. Studley.
- H.E. 136su. Problems of Income Management. An intensive study of problems relating to individual and family budgets. Readings, discussions, and field work. (3 cred.; sr.; prereq., 34, 35, 170, Ag.Econ. 126 parallel; MWF VI, VII; 203HE.) Lucy A. Studley.
- H.E. 150su.\* Art History and Appreciation. The historical development of painting, sculpture, architecture, decoration, furniture, and costumes, studied with special emphasis on design and influence upon modern styles. (3 cred.; jr., sr.; prereq., 51 or equivalent; MTWThFS II; 313HE.) Harriet Goldstein.

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

\* These courses are of special interest to those taking work in fine arts.

- H.E. 170su. Nutrition of the Family. The fundamental principles of human nutrition as applied to the feeding of individuals and groups under conditions of health, and under such pathological conditions as are chiefly dependent upon dietetic treatment. (3 cred.; jr., sr.; prereq., 80 or 81, Agr. Biochem. 4, Physiol. 4; MTWThFS II; 203HE.) Alice Biester.
- H.E. 171su. Child Nutrition. Lectures, discussions, and field work dealing with the principles of child nutrition and with the formation of desired food habits. (3 cred.; jr., sr.; prereq., 170 or parallel, H.E.Ed. 40; MTWThFS IV, TTh VI, keep V hr. open for observation in Nursery School; OL.) (Limited to 16.) Alice Biester.
- H.E. 182su. Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. (3 cred.; jr., sr.; prereq., 80; MTWThFS I, II; 207HE.) (Limited to 12.) Kathryn B. Niles.
- H.E. 205su. Home Economics Seminar. A critical study of selected topics, and recent advances in home economics involving outside readings, oral and written reports. (1 cred.; hrs. and days ar.) Clara M. Brown, Harriet Goldstein, Ethel L. Phelps.

## HOME ECONOMICS EDUCATION

### FIRST TERM

#### UNDERGRADUATE COURSES

- H.E.Ed. 42su.<sup>1</sup> Special Methods of Teaching Home Economics. The psychological bases for teaching; methods of teaching applied to home economics. Required of all students preparing to teach. (3 cred.; jr., sr.; prereq., H.E. 13, 22, Ed.Psy. 55 or Agr.Ed. 11; MWF VI, VII; 213HE.) Ella J. Rose.

#### GRADUATE COURSES

- H.E.Ed. 142su. Educational Measurements in Home Economics. Survey of accomplishment in this field; evaluation and construction of objective tests. (2 cred.; sr.; prereq., 42, Ed.Psy. 55; MTThF I; 213HE.) Clara M. Brown.
- H.E.Ed. 143su. Home Economics Curricula. A study of the objectives of home economics in the junior and senior high schools; organization of curricula. (2 cred.; jr., sr., grad.; prereq., 42 or parallel; MTFS III; 213HE.) Clara M. Brown.
- H.E.Ed. 145su. Administration and Supervision of Home Economics. A study of the duties and problems of teacher trainers, and city and state supervisors of home economics. (3 cred.; grad.; prereq., 42, 49, 143; MTWThFS IV; 213HE.) Ella J. Rose.
- H.E.Ed. 147su.\* Organization and Methods for Related Art Teaching. Organization of a related art course and methods of teaching art principles as applied to familiar objects and processes. (3 cred.; jr., sr.;

<sup>1</sup> Prerequisites waived for teachers of home economics.

\* This course is of special interest to those taking work in fine arts.

prereq., 42 or parallel, H.E. 53, 131 or parallel; MWF VI, VII; 313HE.) Harriet Goldstein.

H.E.Ed. 149su. Research Problems. A study of the methods used in collection, treatment, and interpretation of data in the field of home economics. (Cred. ar.; sr., permission of instructor, grad.; hrs. and days ar.; 213HE.) Clara M. Brown.

## HORTICULTURE

### FIRST AND SECOND TERMS

190su, 191su, 192su. Special Problems. A study of problems based upon work given in preliminary horticultural courses. (2-4 cred.; jr., sr., grad.; ar.) W. H. Alderman, W. G. Brierley, F. A. Krantz, T. M. Currence, A. N. Wilcox.

Thesis. Arrangements will be made for graduate students to work on their thesis problems throughout the first and second terms of the summer school.

## PLANT PATHOLOGY AND BOTANY

### FIRST AND SECOND TERMS

206su. Special Problems. This is a course primarily for graduate students. Special assignment of work in laboratory and field problems in pathological research. E. C. Stakman, J. G. Leach, J. J. Christensen, Louise Dossdall.

## THE LAW SCHOOL

The Summer Session for 1929 will cover a period of ten and one-half weeks, divided into two terms. First term lectures begin June 20 and end July 27; second term lectures begin July 29 and end August 31. Students in first year subjects must attend both terms to obtain credit. Other students may complete a program of studies in either term. Seven and one-half quarter credits may be earned each term. All classes will be held in the forenoon Monday to Friday inclusive.

The Summer Session is a regular part of the work of the school. The character of the instruction and the grade of work required are the same as in the academic year. The session is equivalent to one third of the academic year. A student may complete a year of work by attending three successive summer sessions, or a half year of work by attending one summer session and one summer term. Credits earned may be used to shorten the calendar period of study, to lighten the burden of the academic year, or to supplement the course required for the first law degree. Credits obtained in the summer may be applied toward the first law degree and surplus credits earned in the third year may be applied toward the degree of master of laws. Attendance for two summers enables a student to complete in his third year all the class work required for the Master's degree, and this degree will be conferred upon completion of a satisfactory thesis.

## ADMISSION AND FEES

Admission requirements are the same as for the regular academic year. Candidates must have completed two years of work in an accredited college with an average of one honor point for each credit in all college work completed up to the date of admission. A few persons who have not completed the college work may be admitted as special students on petition showing that they are at least twenty-three years of age, and have had education and experience that may be deemed an equivalent of the college work.

Students of satisfactory standing from approved law schools will be admitted to the Summer Session and will be given certificates for the work completed.

Registration dates are, for the first term, June 18, 19; for second term, July 27. Tuition fees are \$25 each term. A general deposit fee of \$5 is charged, part of which is returned.

## COURSES

### FIRST YEAR

Contracts. Eight hours a week both terms. Keener's *Cases on Contracts* (second edition). J. L. Parks.

Agency. Five hours a week both terms. Mechem's *Cases on Agency* (second edition). R. H. Wettach.

SECOND AND THIRD YEARS

Negotiable Instruments. Five hours a week both terms. Smith and Moore's *Cases on Bills and Notes* (second edition). R. M. Perkins.  
 Bankruptcy. Three hours a week both terms. Williston's *Cases on Bankruptcy* (second edition). R. M. Perkins.

Damages. Three hours a week both terms. Beal's *Cases on Damages* (third edition). R. H. Wettach

Carriers. Five hours a week first term. Green's *Cases on Carriers*. H. J. Fletcher.

Suretyship. Five hours a week first term. Ames' *Cases on Suretyship*. H. J. Fletcher.

Equity III. Five hours a week first term. Ames' *Cases on Equitable Jurisdiction*, Vol. 2. H. L. McClintock.

Municipal Corporations. Five hours a week first term. Tooke's *Cases on Municipal Corporations*. H. L. McClintock.

Persons. Five hours a week second term. McCurdy's *Cases on the Law of Persons and Domestic Relations*. J. Paige.

Labor Law. Five hours a week second term. Sayre's *Cases on Labor Law*. J. Paige.

Interstate Commerce. Five hours a week second term. Frankfurter's *Cases under the Interstate Commerce Act* (second edition). H. Rottschaefer.

Taxation. Five hours a week second term. Rottschaefer's *Cases on Taxation*. H. Rottschaefer.

# THE MEDICAL SCHOOL

## GENERAL INFORMATION

### THE SUMMER QUARTER—TERMS

The first term of the summer quarter will extend from June 18 (classes begin June 20) to July 27; the second, from July 28 to August 31. Students may attend either or both terms.

### 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 prerequisites.

### CLINICAL YEARS

The Medical School offers full regular programs for the first quarter of the junior year, and the second 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 annual 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 unclassified students, receiving subject credit only. If such students desire legal time credit toward a medical degree, they should arrange same with the institution from which they intend to take such degree. No obligation to accept such students into regular classes at this school may be attached to unclassified registration. Such students from other medical schools may take one of the programs listed below (except section clinics) 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 Medical School bulletin to make sure in what degree the courses listed fulfill their respective needs. They should consult department heads in their own schools as to equivalence of courses offered at the University of Minnesota to those required in the medical school where they expect credit.

### PROGRAMS FOR CLINICAL YEARS

The following are the required courses to be offered in the clinical years.

#### FIFTH YEAR (JUNIOR MEDICAL)

The first quarter courses of the fifth year (junior medical) will be given in the summer of 1929. These courses are as follows: Medicine 23su, 25su, 26su, 29su, 42su; Obstetrics 23su and 24su; Pediatrics 24su; Pharmacology 105su and 108su; Surgery 21su. Sequence clinics (see special schedule), 3 hours a week. See departmental statements for hours and credits. Electives are optional.



## SIXTH YEAR (SENIOR MEDICAL)

The program for the summer quarter will consist of the following courses. For description and schedules see departmental statements.

*Division A*

Obs. 22su, Obs. 25su, Med. 30su, Path. 109su, Med. 33su, Med. 47su, Ped. 29su, P.M.&P.H. 101su, Surg. 41su.

*Division B*

Med. 30su, Obs. 22su, Obs. 25su, Obs. 26su, Obs. 27su, Obs. 29su, Ped. 26su, Ped. 27su, Ped. 28su, Ped. 29su, Path. 109su, O.&O. 23su, 24su, 25su.

*Division D*

Obs. 25su, Med. 27su, Med. 30su, Surg. 28su, 29su, 47su, Path. 109su, Ped. 29su.

Under the curriculum senior students are assigned, in addition to the above, to a particular clerkship and to particular dispensary clinics each quarter, for which see special schedule.

## 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 unclassified students, without matriculation. But students who desire to secure time credit toward the degree of doctor or bachelor of medicine in this school must matriculate in the regular way (see requirements in the annual bulletin of the Medical School).

## OPPORTUNITIES FOR PRACTITIONERS

All the summer quarter 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 Extension Division. These courses are exclusively for practitioners and are largely practical in nature. Circulars will be sent on request.

The regular clinics in the University Hospital and Dispensary, the Minneapolis General Hospital, the Ancker Hospital, and the Wilder Dispensary, St. Paul, will go on as usual during the summer quarter, and will be open to visiting physicians.

## FEES

The Medical School tuition fee for a full summer quarter is \$75 for residents of Minnesota, and \$100 for non-residents. Less than a full program may be paid for on a clock hour basis, namely \$3.25 (non-residents, \$4.50) for each weekly clock hour of scheduled work per quarter. In addition each student will pay the incidental fee of \$5, and a deposit of \$10.

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 (\$100.00)	\$37.50 (\$50.00)
Incidental fee .....	6.00	<del>30.00</del> 3.00
Deposit .....	10.00	10.00
	\$91.00 (\$115.00)	\$50.00 (\$62.50)

Fees must be paid on the above basis by all who elect the program of clinical subjects in the junior and senior medical years; and by all who desire time credit on the medical course.

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 they may at their option pay the regular summer session fee of \$25 per term, plus the laboratory fees in courses requiring them, and the deposit fee of \$10.

ELECTIVES

Various electives will be offered in the laboratory and clinical departments. See departmental statements in this bulletin and also special summer quarter programs of the Medical School (to be published later) for details.

NURSING STUDENTS

No beginning students can be received in the summer quarter. For the regular courses, requirements, etc., see the bulletin of the School of Nursing.

FEES FOR STUDENTS IN THE SCHOOL OF NURSING

For undergraduate students in the School of Nursing, whose work in the Summer Session is entirely in the hospitals, or in field service not involving instruction by members of the staff who are paid from the summer session budget, there will be no tuition fee. For students who take regular class work on the campus which is in charge of members of the staff who are paid from the summer session budget, a tuition fee at the rate of \$1 per clock hour for the courses pursued will be charged.

NURSING TEACHERS AND ADMINISTRATORS

Special courses for teachers and administrative officers in nursing schools will be offered in the Summer Session. See departmental announcements of Nursing 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 TECHNICIANS

Excellent courses for medical technicians are offered in the summer quarter. A special circular will be sent upon request. See also departmental statements.

## COURSES FOR DENTAL STUDENTS

For appropriate courses in the laboratory sciences, dental students should consult the departmental statements which follow. For dental clinical courses see page 93.

## ANATOMY

## FIRST TERM

- 5su. Gross Human Anatomy. Dissection of abdomen and lower extremity. Disarticulated skeletons issued for study of osteology. (9 cred.; 3d yr. med.; prereq., Zool. 1-2; MTWThFS I, II, III, IV, TTh VI, VII, VIII; 304,306IA.) Laboratory fee, \$7.50. Class limited to 48. Application for admission must be made in advance to the secretary of the Students' Work Committee. C. A. Erdmann and assistants.
- 9su. Systematic Anatomy. Human osteology and splanchnology, with dissection of the pig fetus. (5 cred.; pre-junior dent.; prereq., Zool. 1-2; MTWThFS I, II, III; 313-301IA.) Laboratory fee, \$5. Class limited to 24. S. P. Miller.
- 14su. Histology and Embryology. Minute structure and development of the tissues and organs, with special emphasis upon the oral region and digestive tract. (8 cred.; pre-junior dent.; prereq., Zool. 1-2, Anat. 9-10; MTWThFS I, II, III, IV; 102,213IA.) Laboratory fee, \$7.50. C. M. Jackson and assistants.
- 103su. Human Histology. Minute structure of the various tissues and organs. (9 cred.; 3d yr. med.; prereq., Zool. 1-2, Anat. 5-6-7; MTWThFS I, II, III, IV, MWF VI; 102,215IA.) Laboratory fee, \$7.50. C. M. Jackson and assistant.
- 133su. Anatomy of the Fetus and Child. A survey of prenatal and post-natal development. (3 cred.; prereq., Anat. 103 or equivalent; hrs. ar.) R. E. Scammon.
- 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.) Laboratory fee, \$1 per cred. C. M. Jackson or R. E. Scammon.
- 163su. Seminar in Human Growth. Permission by Mr. Scammon required. (Cred. and hrs. ar.)
- 204su. Research in Anatomy. Research work in gross or microscopic anatomy, histology, embryology, or neurology. Permission by instructor required. (Cred. and hrs. ar.) C. M. Jackson, R. E. Scammon.

## SECOND TERM

- 6su. Gross Human Anatomy. Dissection of head, neck, thorax, and upper extremity. Continuation of 5su. (9 cred.; MTWThFS I, II, III, IV,

- TTh VI, VII, VIII, IX; 304-306IA.) Laboratory fee, \$7.50. Class limited to 48. S. P. Miller and assistants.
- 105su. Anatomy of the Head and Neck. Human dissection. (5 cred.; pre-junior dent.; prereq., Anat. 9; MTWThFS I, II, III, IV; 304-308IA.) Laboratory fee, \$5. Class limited to 12. S. P. Miller and assistants.
- 111su. Human Neurology. Morphology of the central nervous system and sense organs. (6 cred.; 4th yr. med. and others; prereq., Anat. 103, 107; MTWThF I, II, III, IV, S I, II; 102,213IA.) Laboratory fee, \$5. A. T. Rasmussen and assistant.
- 156su. Advanced Anatomy. See under First Term, Course 156. Permission by Mr. Rasmussen required. (Cred. and hr. ar.)
- 204su. Research in Anatomy. See under First Term, Course 204. Permission by Mr. Rasmussen required. (Cred. and hrs. ar.)

## BACTERIOLOGY

## FIRST TERM

- 51su. General Bacteriology. Culture media; methods of staining and identification; principles of sterilization and disinfection; examination of air, water, milk; relation of bacteriology to the industries. (5 cred.; prereq., general chemistry and biology; MTWThF VI, VII, VIII; 214,201MH.) Laboratory fee, \$1.50. R. G. Green.
- 114su. The Higher Bacteria. Study of morphology, cultivation, and classification of actinomycetes, yeasts, and molds. (3 cred.; prereq., general bacteriology; MTWF II, III; 201MH.) Laboratory fee, \$1.50. R. G. Green.
- 150su. Advanced Bacteriology. Opportunity of working out special problems. (Prereq., General Bacteriology; cred. and hrs. ar.) Laboratory fee, \$1 per credit. W. P. Larson.
- 201su. Research in Bacteriology. Graduate students of the necessary preliminary training may elect research, either as major or minor, in bacteriology. (Permission required; cred. and hrs. ar.; 201MH.) W. P. Larson.

## SECOND TERM

- 101su. Special Bacteriology. The pathogenic bacteria, especially in relation to definite diseases; principles of infection and immunity. (4 cred.; 4th yr. med. and others; prereq., General Bacteriology; MTWThF VI, VII, VIII; 201-214 MH.) Laboratory fee, \$1.50. A. T. Henrici.
- 116su. Immunity. Laws of hemolysis. Quantitative relationship between antigen and antibody. Wasserman reaction. Opsonins. Vaccines. Precipitin reaction. Blood-grouping. Anaphylaxis. Atopy. (3 cred.; prereq., General Bacteriology; MTThF II, III; 201MH.) Laboratory fee, \$1.50. A. T. Henrici.
- 201su. Research in Bacteriology. (Cred. and hrs. ar.) A. T. Henrici.

## PATHOLOGY

## BOTH TERMS

- 101su. General Pathology. Circulatory disturbances, degenerations, inflammation, tuberculosis, syphilis, tumors, neuropathology. (9 cred.; prereq., histology, anatomy, embryology, biochemistry; MTWThF I, II, III; 104IA.) E. T. Bell, J. S. McCartney, P. H. Guttman, C. H. Slocumb.
- 104su. Autopsies. Post-mortem technique; examination of fresh organs, etc. (Prereq., 101; cred and hrs. ar.; 110IA.) 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. (11 hrs. cred.; F 4:00-4:50; 104IA.) Staff.
- 109xsu. Clinical Pathological Conference. (Th 11:30-12:30; Mpls. Gen. Hosp. Elective.) Staff.
- 116su. Tumor Clinic. (1 cred.; 22 hrs.; prereq., Pathology 102; M 9:00-11:00; UH.) E. T. Bell, J. S. McCartney, O. J. Campbell.
- 201su. Research. Students of the necessary preliminary training may elect research, either as major or minor in pathology. Permission required. (Cred. and hrs. ar.) E. T. Bell, B. J. Clawson, J. S. McCartney, J. F. Noble.

NOTE.—All courses may be taken either or both terms except 101, which must be taken both terms for credit.

## PHARMACOLOGY

## FIRST AND SECOND TERMS

- 1su. Elementary Pharmacology. A brief study of drugs for nurses and others. (3 cred.; 33 hrs.; prereq., physiology; hrs. ar.) C. B. Wright.
- 4su. Pharmacology. The history, origin, nature, pharmacal preparations, and use of drugs. (4 cred.; 44 hrs.; limited to 2d yr. dental students; prereq., physiology; TF 2:00-3:00 p.m., W 2:00-4:00 p.m.; 322MH.) E. D. Brown, R. N. Bieter.
- 6su. Experimental Pharmacology. For dental students. (1 cred.; 22 hrs.; ar.) E. D. Brown, R. N. Bieter.
- 102su. Experimental Pharmacology. Laboratory portion only. Exercises illustrating the preparation and action of medicines. Laboratory fee, \$3. (3 cred.; 66 hrs.; limited to 4th yr. med.; prereq., physiology; TTh 3:00-6:00 p.m.; 322MH.) A. D. Hirschfelder, E. D. Brown, R. N. Bieter.
- 105su. General Pharmacology. Same as Course 102 in continuation. (22 hrs.; limited to 5th yr. med.; prereq., physiology; TThS III first term, T III second term.) A. D. Hirschfelder, E. D. Brown, R. N. Bieter.
- 108su. Prescription Writing. The principles of prescription writing. (5th yr.; 11 hrs.; ThS III second term.) E. D. Brown.
- 109su.<sup>1</sup> Pharmacological Problems. Experimental study of special topics in pharmacology, with a review of the literature. Laboratory fee of

<sup>1</sup> Permission required.

\$1 per credit. (3 cred. or ar.; prereq., physiology; 3:00-6:00 p.m. or hrs. ar.) A. D. Hirschfelder, E. D. Brown, R. N. Bieter.

203su.<sup>1</sup> Research in Pharmacology. Open to graduate and advanced students; hrs and cred. ar.; permission required.) A. D. Hirschfelder, E. D. Brown, R. N. Bieter.

## PHYSIOLOGY

### FIRST TERM

- 4su. Human Physiology. A brief course for academic and home economics students. Lectures, demonstrations, recitations. (4 cred.; prereq., high school or college biology and chemistry; MTWThFS I, II; rec. and dem.) J. T. King and assistant.
- 58-59su. Human Physiology. An intermediate course for academic, dental, and physical education students, and others. (8 cred.; prereq., general chemistry and anatomy or zoology; lect., rec. and dem., MTWThFS I, II; lab.,<sup>2</sup> MTWFS III, IV, Th III, V.) Laboratory fee, \$3. J. T. King and assistant.
- 100su. Physiologic Chemistry. Metabolism of carbohydrates, fats, and proteins in health and disease. (5 cred.; prereq., organic chemistry and physics; lect., MTWThF I; 214 MH.; lab., MTWF II, III, IV, Th II, IV, V; 310MH.) Laboratory fee, \$5. Lectures only; 3 cred. may be registered for as 100xsu. Laboratory only as 100ysu. J. F. McClendon and assistant.
- 103su. Physiology of Muscle, Nerve, Blood, Circulation, Respiration, Digestion. (8 cred.; 4th yr. med. and others; prereq., organic chemistry and zoology; lect. and rec. MTWThFS I-II; lab., MTWF III-IV, Th IV-V; 301,315MH.) Laboratory fee, \$5. Lectures only, 5 cred. may be registered for as 103xsu. F. H. Scott and assistant.
- 113su. Problems in Physiology. Arranged by instructor with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Conferences and reading. May be taken one or more terms. (3 cred. or ar.; prereq., Courses 103, 104, or equivalent; 310MH.) Laboratory fee, \$1 per credit. F. H. Scott.
- 153su. Problems in Physiologic Chemistry. Arranged by instructor with qualified students for special work. May be taken one or more terms. (3 cred. or ar.; prereq., Course 100-101; 2:30-5:30; TTh or ar.; 310MH.) Laboratory fee, \$1 per credit. J. F. McClendon.
- 203su. Research in Physiology. (Cred. and hrs. ar.) F. H. Scott.
- 205su. Research in Physiologic Chemistry. (Cred. and hrs. ar.) J. F. McClendon.

<sup>1</sup> Permission required.

<sup>2</sup> Students who find it more convenient may arrange to do part of their laboratory work in the afternoon.

## SECOND TERM

- 101su. Physiologic Chemistry. Metabolism of inorganic substances. (5 cred.; prereq., Physiol. 100; lect., MTWThF I; 214MH; lab., MTWF II, III, IV, Th I, II, IV, V; 310MH.) Laboratory fee, \$5. Lectures only, 3 cred., may be registered for as 101xsu. Laboratory only as 101ysu. G. A. Burr and assistant.
- 104su. Physiology of the Nervous System and Special Senses, Metabolism, Nutrition, and Excretion. (7 cred.; 4th yr. med., and others; prereq., Course 103 or organic chemistry and neurology; MTWThFS; lect., I; rec. and lab., II, III, IV; 301, 315MH.) Laboratory fee, \$5. Lectures only, 5 cred. may be registered for as 104xsu. Esther M. Greisheimer and assistant.
- 113su. Problems in Physiology. Continued as in first term. Esther M. Greisheimer.
- 153su. Problems in Physiologic Chemistry. Same as 153su., first term, given above. G. A. Burr.
- 203su. Research. Continued as in first term. Esther M. Greisheimer.
- 205su. Research in Physiologic Chemistry. Continued as in first term. G. A. Burr.

PREVENTIVE MEDICINE AND PUBLIC HEALTH<sup>1</sup>

- 53su. Elements of Preventive Medicine. Susceptibility, resistance, and immunity to disease; methods of spread and the prevention of communicable and degenerative diseases; importance of heredity and environment; proper types and protection of food, water, and milk. (3 cred.; prereq., Bacteriology 1, Physiology 4 or equiv.; MTWThFS II; 129MH.) H. D. Lees.
- 58su. Maternal and Child Hygiene. Maternal welfare program; importance of breast feeding; origin and conduct, infant welfare clinics in cities and rural communities; consideration of child of pre-school and school age as to malnutrition, physical defects, cardiac and nervous disorders. (2 cred.; prereq., 50, 52, or 53; jr., sr.; MTWF VI.) Ruth E. Boynton.
- 60su. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States. Early diagnosis and sanatorium 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; minimum 16 students to hold course.) J. A. Myers.
- 62su. Principles of Public Health Nursing. Development, principles, technique of public health nursing; methods of co-operative endeavor with social agencies; health teaching as an essential factor in promotion of individual, family, and community well-being. (3 cred.; public

<sup>1</sup> Students registering for public health nursing courses should write direct to Miss Eula B. Butzerin for credential blanks.

- health nurses; prereq., 53 or equiv.; MTWThFS I; 129MH.) Eula B. Butzerin.
- 64su. Field Practice in Infant Welfare Nursing. For public health nurses. Class instruction, observation, and supervised practice in home visiting in the interest of breast feeding and well baby care; in conducting well baby clinics and behavior clinics for pre-school children; in understanding family problems affecting children. (3 cred.; prereq., 62; ar.; 101B MH.) Eula B. Butzerin, Helen R. Peck.
- 67su. Field Practice in a Tuberculosis Sanatorium. For public health nurses. Observation and practical care of pulmonary, osseous, laryngeal tuberculosis; tuberculosis enteritis; general sanatorium treatment; special treatment; exercise; laboratory; occupational therapy and the reading of literature on tuberculosis. (2 cred.; prereq., 60 and 62; ar.; 101B MH.) Eula B. Butzerin.
- 68su. Field Practice in Visiting Nursing. For public health nurses. Lectures, demonstrations, supervision, and field practice in bedside care of general and maternity patients; communicable disease, tuberculosis and mental cases with special emphasis upon recognition of social problems, co-operation with social agencies and accurate record keeping. (5 cred.; prereq., 62; ar.; 101B MH.) Eula B. Butzerin, Ruth Houlton.
- 69su.<sup>1</sup> School Nursing. Discussion will include problems of administration and an analysis of the duties of the school nurse in giving health service—also subject-matter and method of presentation of health teaching. (4 cred.; prereq., 62 or experience in school nursing; MTWF III, IV.) Eula B. Butzerin, Robina Kneebone.
- 71su.<sup>1</sup> Administration and Supervision in Public Health Nursing. Course is planned for the experienced public health nurse and deals with the principles and practices of supervision in public health nursing and with problems of administration in both city and rural communities. (2 cred.; prereq., 62 or adequate experience in public health nursing; MTWThFS VII, VIII, July 15 to 27, inclusive.) Eula B. Butzerin, Edna L. Foley.
- 80su. Health Supervision of the School Child. Intended for teachers and others interested in child health and health education. Consideration of hygiene of physical and mental growth, health supervision of school children, teaching of health subjects, and sanitation of school environment. The course deals with practical problems of school health supervision and health education. (3 cred.; prereq., Course 50 or 53, or by permission; MTWThFS I.) Ruth E. Boynton.
- 101su. Public Health Administrative and Field Work. Demonstrations of health agencies at work; boards of health, laboratories, filtration, pasteurization, and garbage disposal plants. Presentation of actual health problems. Groups of 10 to 15 medical students for 6 weeks. (18 hrs.; sr. med.; prereq., 100; T; see clerkship schedule; 101B MH.) Staff.
- 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.; ar.; 101B MH.) Staff.

<sup>1</sup> In connection with these courses see courses for nursing teachers and administrators, nursing departmental statement.



## SECOND TERM

- 64su. Field Practice in Infant Welfare Nursing. Same as first term.  
 67su. Field Practice in a Tuberculosis Sanatorium. Same as first term.  
 68su. Field Practice in Visiting Nurses. Continuation of first term.  
 101su. Public Health Administrative and Field Work. Same as first term.

## MEDICINE

*Required Courses*

- 23su. The Principles and Practices of Medicine, Exclusive of Neurology and Dermatology. Readings and recitations. (11 hrs.; 5th yr.; S 8:00-8:50; 129MH.)
- 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) gastro-intestinal. (40 hrs. cred.; 5th yr. See special schedule.) G. E. Fahr, J. A. Myers, C. B. Wright, M. Wetherby, and others.
- 25xsu. Part of 25su, 20 hrs. cred.; given at the Wilder Dispensary, St. Paul.
- 26su. Clinical Chemistry and Microscopy. Methods of laboratory examination for diagnostic purposes. (66 hrs.; Div. A, juniors; prereq., pathology and physiologic chemistry. (Lect., MThF, 3:00-4:00; lab., W 3:00-5:00; 129, 301MH.) Grace Medes.
- 27su. 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) gastro-intestinal. See special schedule. (66 hrs.; 6th year; daily 6 weeks for each student; UD.) G. E. Fahr, J. A. Myers, C. B. Wright, M. Wetherby, and staff.
- 29su. Clinic in Medicine. Div. A, junior. (11 hrs.; T 8:00-8:50; UH.) H. Berglund and others.
- 30su. Clinic in Medicine. Sixth year, Divisions A, B, D. (22 hrs.; TTh 8:00-8:50; UH.) H. Berglund and others.
- 33su. Clinical Clerkship. The personal observation of patients in hospital; taking and recording of case histories; making of provisional diagnosis; and study of treatment. One section at a time spends three weeks in residence at the Glen Lake Sanatorium, and one section at a time spends three weeks at a state insane hospital. Sixth year, sections of Division A (300 hrs. cred.). See special schedule. H. Berglund and staff.
- 33xsu. Clinical Clerkship. Part of 33su at Minneapolis General Hospital. G. E. Fahr and staff.
- 51su. Section Clinics in Medicine. For juniors. (6 students; M 8:30-10; Ancker Hospital.) See sequences in special schedule. J. A. Lepak or H. Oerting.
- 51bsu. Same as above (F 8:30-10:00).

*Elective Courses*

- 102su.<sup>1</sup> The Respiratory Organs in Health and Disease. For students who desire training in preparation of scientific papers for publication. The

<sup>1</sup> Permission of instructor required.

student selects a problem pertaining to some part of the respiratory tract, which he pursues independently or in collaboration with instructor. Limited to 5 students. (Cred. and hrs. ar.; 5th and 6th yr.; 104B MH.)

J. A. Myers.

- 105su.<sup>1</sup> Problems in Pathological Physiology. Experimental work in physiology of the cardiovascular, gastro-intestinal, respiratory, and renal systems as affected by experimental procedures simulating the common processes of disease in those organs. One to four students. (Problems and cred. ar.; soph.; hrs. ar.; Laboratory of Pathological Physiology MH.) G. E. Fahr, J. Davis, and staff.
- 106su.<sup>1</sup> Problems in Clinical Physiology. Experimental and clinical investigations of the pathological functions in cardiovascular, renal, gastro-intestinal, and respiratory diseases. One to four students. (Problems and cred. ar.; jrs., sr.; ar.; Laboratory of Pathological Physiology, MH; Minneapolis General Hospital; UD.) G. E. Fahr, J. Davis, and staff.
- 203su.<sup>1</sup> Research in Medicine. (Cred. ar.; ar.) H. Berglund, G. E. Fahr.

#### DIVISION OF NERVOUS AND MENTAL DISEASES

##### *Required Courses*

- 42su. Clinics in Nervous and Mental Diseases. Division A, fifth year. (17 hrs.; Sec. 2, M; Sec. 4, W; Sec. 6, F; 8:30-10:00; Ancker Hospital.) E. M. Hammes, G. M. Ruhberg.
- 42xsu. Clinics in Nervous and Mental Diseases. Division A, fifth year. (17 hrs.; Sec. 1, M; Sec. 3, W; Sec. 5, F; 8:30-10:00; Minneapolis General Hospital.) J. C. Michael, R. H. Ahrens.
- 43su. Nervous and Mental Diseases. Observation and study of cases in the University Dispensary; required of clerks in nervous and mental service at University Hospital. Credit included in clerkship, Medicine 33. J. C. McKinley, C. J. Hutchinson.

##### *Elective Courses*

- 85su.<sup>1</sup> Externship in Nervous and Mental Diseases. (Cred. and hrs. ar.; prereq., Med. 33; UH.) A. S. Hamilton and staff.
- 124su.<sup>1</sup> Advanced Neuropathology. Individual gross and microscopic studies on existing preparations in neuropathology. Limit, 2 students. (Cred. and hrs. ar.; prereq., Path. 102; 133MH.) J. C. McKinley.
- 125su.<sup>1</sup> Problems in Neuropathology. The student will be assigned a topic for special study. Limit, 2 students. (Cred. and hrs. ar.; prereq., Path. 102; 133MH.) J. C. McKinley.

#### DIVISION OF DERMATOLOGY

##### *Required Courses*

- 47su. Physical Diagnosis and Therapy. Observation and study of cases in the University Dispensary and Minneapolis General Hospital; a part

<sup>1</sup> Permission of instructor required.

of required clinics. (40 hrs. cred.; see special schedule, sections of sr. class; daily 1:00-3:00.) H. E. Michelson, S. E. Sweitzer, and others.

*Elective Courses*

- 91su. Night Clinic in Dermatology and Syphilis. Limited to 6 students. (33 hrs.; MTh 7:00-8:30; UD.) D. D. Turnacliiff.
- 150su. Histopathology of the Skin. Clinic and pathologic phases will be exemplified. Same as Path. 110. (11 hrs.; prereq., Path. 102; T 2:30-3:20; 108IA.) E. C. Gager.

OBSTETRICS AND GYNECOLOGY

FIRST AND SECOND TERMS

*Required Courses*

- 22su. Operative Obstetrics. A study of operative obstetrics. (Prereq., Courses 20 and 21; 11 hrs.; M 3:00-3:50; 104IA.) R. E. Swanson.
- 23-24su. Gynecology. A study of diseases of women. (33 hrs.; jr.; TThS 9:00-9:50; 104IA.) L. W. Barry.
- 25su. Obstetrics and Gynecology. Lectures, class clinics, and cases analysis of the pathology of obstetrics and gynecology. (22 hrs.; sr.; MF 8:00-8:50; Hosp. lect. room.) J. C. Litzenberg.
- 26su. Clinical Clerkship in Obstetrics and Gynecology. The study and care of assigned patients in the University Hospital, out-patient service, and Salvation Army Home; manikin practice, case histories, physical and laboratory examinations; parturition and bedside clinics, and operations. (75 hrs.; prereq., Courses 20, 21, 22, 23, and 24; sections of Div. B, sr.; daily 9:00-10:30; UH.) J. C. Litzenberg and hospital staff.
- 26xsu. Clinical Clerkship in Obstetrics and Gynecology. Part of Course 26su, but given at the Minneapolis General Hospital or Ancker Hospital, St. Paul. (MTWThFS 9:15-12:00.) F. L. Adair and hospital staff.
- 27su. Clinic in Obstetrics and Gynecology. History taking, physical examinations, diagnosis, demonstrations, and clinics. See special schedule. (24 hrs.; sr.; prereq., Courses 20, 21, 22, and 23. Sections of sr. Div. B. MTWThFS 10:30-12:00; UD.) Dispensary staff.
- 29su. Clinic in Obstetrics and Gynecology. Clinics in dispensary of Minneapolis General Hospital. (12 hrs.; 6th yr. med.; see clerkship schedule; MWF 12:30-2:00.) C. E. Proshek.

*Elective Courses*

- 25su. Obstetrics and Gynecology Clinic. The pathology of pregnancy, labor and the puerperium, and of diseases of women. No limit. (Prereq., Obs. 20, 21, 23, and 24; required of Div. C srs., elective for others; MF 8:00-8:50; UH.) J. C. Litzenberg.
- 50su. Gynecologic Clinic. Diagnosis and treatment of diseases of women. Limit four students. (34 hrs.; TTh 1:30 to 3:00. Wilder Dispensary.) J. F. Bicek, E. C. Hartley.

- 53asu. Clinic in Obstetrics. Limit, three to six students. (16 hrs.; F 8:45-10:00; Minneapolis Gen. Hosp.) F. L. Adair and others.
- 53bsu. Clinic in Gynecology. Limit, three to six students. (16 hrs.; F 10-15-11:45; Minneapolis Gen. Hosp.) F. L. Adair and others.
- 55su. Prenatal Clinics. Antepartum care of pregnant women at the various prenatal stations. One student at each station. (11 hrs. cred.; Obs. 55asu. Wells Memorial, M 9:00, J. H. Simons; Obs. 55bsu. Emanuel Cohen Community Center, C. O. Maland; Obs. 55csu, South Town Clinic, F 1:30, J. P. Heibert.)
- 59su. Gonorrhoea in the Female. Limited to three jr. or sr. students. (T 7:00-9:00 p.m.; Minneapolis Gen. Hosp.) F. L. Adair and staff.
- 59asu. Same as 59su. (F 7:00-9:00 p.m.)

## OPHTHALMOLOGY AND OTO-LARYNGOLOGY

## FIRST AND SECOND TERMS

*Required Courses*

- 23su. Clinic in Diseases of the Eye. Methods of examination, diagnosis, and treatment. (30 hrs.; srs., see clerkship schedule; MTWThFS 1:00-3:00; UD.) J. S. Macnie and associates.
- 24,25su. Clinic in Diseases of the Ear, Nose, and Throat. Methods of examination, diagnosis, and treatment. (30 hrs.; srs., see clerkship schedule; MTWThFS 1:00-3:00; UD.) K. A. Phelps and associates.

*Elective Courses*

- 121su. Operative Clinic; Ophthalmic. (11 hrs.; srs.; F 9:00-10:00; UH.) J. S. Macnie.
- 121asu. Operative Clinic; Otology and Laryngology. (11 hrs.; srs.; T 8:30-9:30; UH.) E. W. Hansen, C. Hymes.

## PEDIATRICS

## FIRST AND SECOND TERMS

*Required Courses*

- 24su. Clinic in Contagious Diseases. A part of course in required sequence clinics. (17 hrs.; 5th yr.; Minneapolis Gen. Hosp., 10:00-11:30; Sec. 1, M.; Sec. 3, W.; Sec. 5, F.; Ancker Hosp., 10:00-11:30; Sec. 2, M.; Sec. 4, W.; Sec. 6, F.) H. L. Eder, F. G. Hendenstrom, and others.
- 27su. Clinical Clerkship in Pediatrics. The observation and study of patients; case histories; physical examinations and provisional diagnoses; treatment. (200 hrs. cred.; Sections of Div. B., sr.; daily, 9:00-12:00; see special schedule.) (a) Three weeks at the University Hospital and Dispensary. F. W. Schlutz, C. A. Stewart, and staff. (b) Three weeks at the Minneapolis General Hospital and Dispensary. E. J. Huenekens, Cecile M. Moriarty, and staff.
- 28su. Infant Welfare Clinic. (6 hrs.; 6th yr.; sections of senior class; TTh 1:30-2:30; 19MH.) A. V. Stoesser.

29su. Clinic in Pediatrics. Selected cases from the University Pediatric Dispensary. Complete résumé of cases including history, physical and laboratory findings, general discussion, diagnosis and treatment. Required of Division B of senior class; elective for others as No. 103. 17 hrs.; 5th and 6th yrs.; Th 3:00-4:30; UH Amphitheater. F. W. Schlutz and others.

*Elective Courses*

FIRST TERM

55esu. Infant Feeding and Diseases of the New-born Clinic. Four to eight students. 22 hrs.; 5th and 6th yrs.; Th 3:00-5:00; Salvation Army Women's Home and Hospital, 1471 Como Ave., St. Paul. W. R. Shannon.

BOTH TERMS

51su. Clinic in Pediatrics. Four to six students. Part of sequence clinics. 17 hrs.; 5th and 6th yrs.; F 10:00-11:30; Minneapolis Gen. Hosp. E. J. Huenekens and others.

52su. Same as 51su. See sequences. M 10:00-11:30; Ancker Hosp. G. K. Hagaman.

52bsu. Same as 52su. W 10:00-11:30.

52csu. Same as 52su. F 10:00-11:30; Ancker Hosp. G. K. Hagaman.

55asu. Infant Feeding Clinic. Two to six students. 11 hrs.; 5th and 6th yrs.; W 9:30-10:30; Minneapolis Gen. Hosp. E. D. Anderson.

55bsu. Infant Feeding Clinic. Two to six students. 11 hrs.; 5th and 6th yrs.; T 1:30-2:30; South Town Children's Clinic. D. M. Siperstein.

55csu. Same as above. (Th.)

55dsu. Infant Feeding Clinic. Two to four students. 11 hrs.; 5th and 6th yrs.; M 10:30-11:30; Pillsbury Settlement House. Alice Rupp.

59su. General Pediatrics Including Skin Diseases. Two to six students. 66 hrs.; 5th and 6th yrs.; TThS 1:00-3:00; Wilder Dispensary, Miller Hosp. By arrangement students may take this course only one or two days a week with corresponding credit. W. L. Colby and others.

102su. Treatment of Laryngeal Diphtheria by Intubation, Tracheotomy, Laryngoscopy, etc. Two to six students. 6 hrs.; 6th yr., and grad.; ar.; MGH. E. S. Platou.

103su. Class Clinic in Pediatrics. Same as Ped. 29. Required of Div. B srs., elective for others. 17 hrs.; 5th and 6th yrs.; Th 3:00-4:30; UH Amphitheater. F. W. Schlutz.

200su. Advanced Study in Diseases of Infants and Children. Cred. and hrs. ar. F. W. Schlutz.

206su. Research in Pediatrics. Ar.; 121MH. F. W. Schlutz, C. A. Stewart.

SURGERY

*Required Courses*

21su. Principles of Surgery. 33 hrs. cred.; TThS 11:00-11:50; UH. W. T. Peyton.

- 27su. Wilder Dispensary Clinic. Daily 12:30-2:30; 20 hrs. cred. Wilder Disp. Part of sequence clinics for jrs. G. A. Williamson, W. H. Von der Weyer.
- 28su. Clinical Clerkship. Personal study of assigned patients; case histories; laboratory examinations; provisional diagnoses with suggestions as to therapy; attendance at operations and observation of post-operative management. Practical instruction in anesthesia. 200 hrs.; sr. class, sections of Div. D; prereq., Surgery 21 and 23; MTWThFS 9:00-12:00; UH. O. H. Wangenstein, O. J. Campbell, W. T. Peyton.
- 28xsu. Same as 28su. Minneapolis Gen. Hosp. A. A. Zierold, E. A. Regnier.
- 29su. Minor Surgery Clinics. Sections of class assigned daily to the Out-Patient Department; a part of required clinics. See special schedule. 30 hrs.; sr.; daily 1:00-3:00; Disp., MH. F. S. McKinney, A. F. Bra-trud, J. M. Hayes, W. A. Hanson.
- 30su. Class Clinic in Surgery. Divs. A, B, and D seniors. 11 hrs. cred.; F 8:00-8:50; UH. O. H. Wangenstein.
- 41su. Orthopedic Clinic. In the Out-Patient Department; a part of required section clinics. See special schedule. 12 hrs.; sr.; MF 1:00-2:30; Disp., MH. E. T. Evans, D. F. Gosin.
- 47su. Genito-Urinary Clinic. In the Out-Patient Department; a part of required section clinics. See special schedule. 20 hrs.; sr.; daily 1:00-3:00; Disp., MH. C. B. Wright, A. G. Wethall, J. C. Giere.

#### *Elective Courses*

- 54su. Proctology; Assistantship in Proctology. A clinical course conducted in the Out-Patient Department. Two to four students. 33 hrs.; jr., sr.; TF 1:00-2:00; Disp., MH. W. A. Fansler, H. E. Hullsiek.
- 56su. Bedside, Diagnostic, and Operative Clinic. Four to eight students. 12 hrs.; jr., sr.; W 10:30-12:00; Minneapolis Gen. Hosp. E. C. Robit-shek, A. A. Zierold, F. A. Olson, E. A. Regnier.
- 57su. Diagnostic and Operative Clinics. Six to sixteen students. See special schedule sequences. 17 hrs.; jr., sr.; MF 10:00-11:30 Ancker Hosp. A. R. Colvin, J. S. Abbott, L. E. Daugherty, E. M. Jones, V. P. Hauser, J. M. Culligan.
- 64su. Night Clinic in Urology; Venereal Diseases. Four students. 33 hrs.; jr., sr., grad.; MTh 7:00-8:30 p.m.; Disp., MH. A. G. Wethall.

### RADIOLOGY

#### *Required Courses*

- 80su. Roentgen Diagnosis for Medical Clerks. Part of Med. 33. L. G. Rigler.
- 81su. Roentgen Therapy for Surgical Clerks. Part of Surg. 28. K. W. Stenstrom.

*Elective Courses*

- 85su. Plate Reading. Limit 4 students. 11 hrs. cred.; jr. or sr.; W 9:30-10:30; UH. L. G. Rigler.
- 88asu. X-Ray Diagnosis. Four to ten students. 11 hrs. cred.; jr. or sr.; F 1:00-2:00; UH. M. B. Hanson.
- 88bsu. X-Ray Diagnosis. Four to ten students. 22 hrs. cred.; jr. or sr.; M 8:30-10:30; MGH. W. H. Ude.
- 95asu. Clinic in X-Ray Therapy. Limit, 3 students. 11 hrs. cred.; jr. or sr.; M 10:00-11:00; UH. K. W. Stenstrom.
- 95bsu. Same as 95asu. W 9:00-10:00.
- 95csu. Same as 95asu. F 9:00-10:00.
- 103asu. Physical Therapy (Clinic). Cred. and hrs. ar.; T. K. W. Stenstrom.
- 103bsu. Physical Therapy (Clinic). Cred. and hrs. ar.; Th. K. W. Stenstrom.
- 204su. Research Problems in Biophysics (same as Physiology 204). Cred. and hrs. ar. K. W. Stenstrom.

## HOSPITAL SOCIAL SERVICE

- 65su. Application of Principles and Practices of Hospital Social Work. Selected medical-social problems of interest to various groups. Includes lectures, observation and supervised work in wards, clinics, and homes, also contacts with other social agencies. (2-4 cred.; M III and hrs. ar.) Marion A. Tebbets, Lydia B. Christ, and assistants.

## NURSING INSTRUCTION

Courses for head nurses, teachers of nursing, and administrators in nursing schools. See also courses in Preventive Medicine and Public Health for public health nursing and administration. A special circular in these courses will be mailed on application to the director, School of Nursing, University of Minnesota.

- 70su. Administration and Supervision of Schools of Nursing. This course is planned for graduate nurses who are concerned with the problems of administration and supervision in nursing schools; present day problems and objectives in nursing education. 5 credits. Blanche Pfefferkorn.
- 72su. Principles of Teaching and Supervision in Schools of Nursing. For graduate nurses in institutional positions as head nurses, supervisors, or teachers. The scientific principles underlying the nursing care of patients. The planning of lessons and demonstrations; correlation of theory and practice; problems of ward and supervision. Methods of developing ward teaching. The case study in nursing. Demonstration of classes and clinics. 2 cred. Deborah MacLurg Jensen.

## COLLEGE OF DENTISTRY

Courses will be offered in the Department 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, A. S. Wells; Operative Dentistry, J. M. Walls; Orthodontia, O. A. Weiss; Prosthetic Dentistry, C. O. Flagstad; Oral Surgery, C. A. Griffith; Major Oral Surgery of the Mouth and Jaws, C. W. Waldron. (Jr., sr., grad.; MTWThF 9:00-12:00 a.m., 2:00-5:00 p.m., and S 9:00-12:00 a.m.)

Classes will be organized in technic work in any course in which there is a sufficient registration.

Fees: full time, \$40; half time, \$20, for each term. In addition each student pays an incidental fee of \$2.50, and a general deposit fee of \$5.<sup>1</sup>

Courses in contributing departments are announced elsewhere in this bulletin. See particularly Anatomy, Bacteriology and Immunology, Chemistry, Pathology, Pharmacology, Physiology.

<sup>1</sup> Students registering for half time in dentistry and for part time in other departments will not be required to duplicate the incidental fee.



## SCHOOL OF CHEMISTRY

In addition to the regular summer courses, a series of special lectures and conferences will be held during a portion of the session this year, constituting a SYMPOSIUM IN PHYSICAL CHEMISTRY. Several European and American authorities have been invited to lecture, conduct research, lead conferences, and give special addresses on various phases of the subject. Credits will be arranged in the courses and seminars. A special announcement of the chemistry symposium will give details of the program.

### INORGANIC CHEMISTRY

#### FIRST TERM

- 1su.<sup>1</sup> General Inorganic Chemistry. A study of general laws of chemistry and of the non-metals and their compounds. (4 cred.; no prereq.; lect., MTWThFS II; 325C; lab., MTWTh VI-VII; 210C.) N. C. Pervier.
- 4su.<sup>1</sup> General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals and their compounds. (4 cred.; prereq., high school chemistry; lect., MTWThFS II; 225C; lab., MTWTh VI-VII; 210C.) H. N. Stephens.
- 6su.<sup>1</sup> General Inorganic Chemistry. A study of general laws of chemistry and of the non-metals and their compounds. (5 cred.; no prereq.; lect., MTWThFS II; 325C; lab., MTWThF VI-VII, TTh VIII; 210C.) N. C. Pervier.
- 9su.<sup>1</sup> General Inorganic Chemistry. A study of the general laws of chemistry and of non-metals and their compounds. (5 cred.; prereq., high school chemistry; lect., MTWThFS II; 225C; lab., MTWThF VI-VII, TTh VIII; 210C.) H. N. Stephens.
- 11su.<sup>2</sup> Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation, and reduction, etc. (4 cred.; prereq., 3 or 5; lect., MTWThFS II; 111C; lab., MTWTh VI-VII; 290C.) M. C. Sneed.
- 12su.<sup>2</sup> Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation, and reduction, etc. (5 cred.; prereq., 8 or 10; lect., MTWThFS II; 111C; lab., MTWThF VI-VII, TTh VIII; 290C.) M. C. Sneed.
- 14su.<sup>1</sup> General Inorganic Chemistry. A study of general laws of chemistry and of the non-metals and their compounds. (5 cred.; no prereq.; lect., MTWThFS II; 325C; lab., MTWThF VI-VII, TTh VIII; 210C.) N. C. Pervier.

<sup>1</sup> A laboratory fee of \$2 is charged for this course.

<sup>2</sup> A laboratory fee of \$3 is charged for this course.

- 17su. Glass Blowing. Exercises in the more important operations in building chemical apparatus. (1 cred.; no prereq.; jr., sr., grad.; MWF VIII-IX.) H. N. Stephens.
- 19su. Teachers' Course. Consideration of the fundamental principles of chemistry with particular reference to the teaching of chemistry in high school. Discussion of such topics as training of the teacher, laboratory equipment, etc. (3 cred.; prereq., 13; lect., MTWThFS IV; 315C.) I. W. Geiger.
- 102su.<sup>2</sup> Advanced Qualitative Analysis. This course includes an analysis of minerals, alloys, paints, and the methods of detecting some of the rarer elements. (2 or 3 cred.; prereq., 21 hrs. ar.) M. C. Sneed.
- 103su. Advanced Inorganic Chemistry. A 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.; prereq., Anal. Chem. 1, 2 and Org. Chem. 52; hrs. ar.) M. C. Sneed.
- 301su.<sup>2</sup> Research in General Inorganic Chemistry. (Cred. and hrs. ar.) M. C. Sneed.

## SECOND TERM

- 5su.<sup>1</sup> General Inorganic Chemistry. A continuation of 4su. (4 cred.; prereq., 4; lect., MTWThFS II; 225C; lab., MTWTh VI-VII; 210C.) G. B. Heisig.
- 10su.<sup>1</sup> General Inorganic Chemistry. A continuation of 9su. (5 cred.; prereq., 9; lect., MTWThFS II; 225C; lab., MTWThF VI-VII; TTh VIII; 210C.) G. B. Heisig.

## ANALYTICAL CHEMISTRY

## FIRST TERM

- 1su.<sup>1</sup> Quantitative Analysis (Gravimetric). Introductory course covering the general principles and methods of quantitative analysis. Typical problems are assigned and attention given to proper laboratory practice. (5 cred.; prereq., 13; lect. or rec., TW V, VI; 315C; lab., MThF V-VIII; TW VII-VIII; 310C.) I. W. Geiger.
- 7su.<sup>1</sup> Quantitative Analysis. (Primarily for pre-medical students and teachers.) An introductory course covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems will be assigned and attention given to proper laboratory practice. (4 cred.; prereq., qual. anal.; lect. or rec., TW V, VI; 215C; lab., MThF V-VIII; TW VII-VIII; 310C.) L. A. Sarver.
- 123-124su.<sup>1</sup> Advanced Analytical Chemistry. A systematic survey by general lectures with typical procedures selected for laboratory practice. Drill in application of modern chemical theory to analytical problems. Offered first term only, but either course may be taken. (3 cred. each; prereq.,

<sup>1</sup> A laboratory fee of \$2 is charged for this course.<sup>2</sup> A laboratory fee of \$3 is charged for this course.

Anal. Chem. 1 and 2; lect. or rec., M V, VI (for 123); Th V, VI (for 124); lab., TWF V-VIII.) L. A. Sarver.

96su.<sup>2</sup> Senior Thesis. (5 cred.; hrs. ar.) I. W. Geiger.

301su.<sup>2</sup> Research in Analytical Chemistry. (Cred. and hrs. ar.) I. W. Geiger.

## ORGANIC CHEMISTRY

### FIRST TERM

1su.<sup>1</sup> Elementary Organic Chemistry. Discussion of important compounds of aliphatic and aromatic series, and preparation of typical substances. This course is primarily for students in professional schools and is not equivalent to Course 51 for students registered in the School of Chemistry. (4 cred.; prereq., 11 or 12; lect., MTWThF IV; 325C; rec., TTh II; 215C; lab., MWF I-III; lab. conference, TTh I; 390C.) L. I. Smith.

113su. The Aliphatic Compounds. An advanced descriptive course, with special emphasis upon the compounds having more than one functional group. May be accompanied by appropriate laboratory work in Organic Chemistry 139. (3 cred.; prereq., Org. Chem. 53; MTWFS III; 315C.) L. I. Smith.

### SECOND TERM

2su.<sup>1</sup> Elementary Organic Chemistry. A continuation of 1su. (4 cred.; prereq., Org. Chem. 1; lect., MTWThF I; 325C; rec., TTh II; 215C; lab., MWF II-IV; T III-IV; 390C.) W. M. Lauer.

## PHYSICAL CHEMISTRY

### FIRST TERM

301su.<sup>2</sup> Research in Physical Chemistry. (Cred. and hrs. ar.) S. C. Lind, L. H. Reyerson.

### SECOND TERM

129su.<sup>2</sup> Principles of Colloid Chemistry. Fundamental principles of the subject with special emphasis on recent advances in this line. Accompanied by six hours of work in the laboratory. (3 cred.; prereq., 8 cred. in phys. chem.; lect., MWF VII; 115C; lab., ar.) L. H. Reyerson.

145su. Chemical Kinetics in Solution. A detailed study of the general principles of velocity of reaction in solution and of the experimental material from which they are derived. (2 cred.; prereq., 101, 102, 103, or equiv.) R. S. Livingston. (Subject to cancellation.)

151su. Chemical Activation in Gaseous Ionization. A course to illustrate the more vigorous types of activation in the chemical effects of ionizing agents such as electrical discharge in gases, cathode rays, X-rays, alpha, beta, and gamma rays. (2 cred.; prereq., 101, 102, 103, or equiv.) S. C. Lind.

301su.<sup>2</sup> Research in Physical Chemistry. (Cred. and hrs. ar.) S. C. Lind.

<sup>1</sup> A laboratory fee of \$2 is charged for this course.

<sup>2</sup> A laboratory fee of \$3 is charged for this course.

## TECHNOLOGICAL CHEMISTRY

## FIRST TERM

- 1su.<sup>1</sup> Power Plant Chemistry. (3 cred.; soph., jr., sr. engineers; prereq., qual. analysis; lect. TTh V; lab., MTWTh VI-VIII; 10C.) E. P. Harding.
- 105su.<sup>1</sup> Technical Gas and Fuel Analysis. (3 cred.; jr., sr., grad.; prereq., quant. analysis 1w and 2s; lect., MW V; 215C.; lab., MTWTh VI-VIII; 210C.) E. P. Harding.
- 107su.<sup>1</sup> General Technical Analysis. Analysis and testing of various industrial products. Includes the regular courses in food analysis and petroleum products offered to chemistry students. (3 cred.; jr., sr., grad.; prereq., quant. analysis 1w and 2s; lect., F V-VI; 215C.; lab., MTWTh VI-VIII; 10C.) E. P. Harding.
- 301su.<sup>2</sup> Research in Technological Chemistry. (Cred. and hrs. ar.) E. P. Harding.

## CHEMICAL ENGINEERING

## FIRST TERM

- 101su.<sup>1</sup> Unit Process. Principles and materials of construction, operation, and uses of chemical machinery. Lectures and recitations. Laboratory work in operating and testing. (4 cred.; jr., sr., grad.; prereq., 20, 21, and 36; MTWThF I-IV, lab., S I-IV.) C. A. Mann.
- 102su. Unit Process Problems. Combustion, gas absorption, drying, distillation, heat transfer and evaporation, fluid flow and filtration, and the general chemical processes. (3 cred.; sr., grad.; prereq., 101; MTWThFS II.) G. H. Montillon.
- 151su.<sup>2</sup> Chemical Manufacture. (Inorganic.) Manufacture of technical products on a scale large enough to afford data for the determination of costs of manufacture. Use of semiplant scale equipment, and technical trade journals. Part of the summer practice required of juniors in Chemical Engineering during the summer between the third and fourth years; must be accompanied by Course 152su. (3 cred.; sr., grad.; prereq., 101; MTWThF I-IX, S I-IV; 90C.) C. A. Mann.
- 152su.<sup>2</sup> Chemical Manufacture. (Organic.) Similar to Course 151su., but in the organic field. Part of the summer practice required of juniors in Chemical Engineering during the summer between the third and fourth years; must be accompanied by Course 151su. (3 cred.; sr., grad.; prereq., 101; MTWThF I-IX, S. I-IV; 90C.) G. H. Montillon.
- 301su.<sup>3</sup> Research in Chemical Engineering. (Cred. and hrs. ar.) C. A. Mann, G. H. Montillon.

## SECOND TERM

- 151su.<sup>2</sup> Chemical Manufacture. (Inorganic.) Manufacture of technical products on a scale large enough to afford data for the determination

<sup>1</sup> A laboratory fee of \$2 is charged for this course.

<sup>2</sup> A laboratory fee of \$3 is charged for this course.

<sup>3</sup> A laboratory fee of \$5 is charged for this course.

- of costs of manufacture. Use of semiplant scale equipment, and technical trade journals. Part of the summer practice required of juniors in Chemical Engineering during the summer between the third and fourth years; must be accompanied by Course 152su. (3 cred.; sr., grad.; prereq., 101; MTWThF I-IX, S I-IV; 90C.) R. E. Montonna.
- 152su.<sup>2</sup> Chemical Manufacture. (Organic.) Similar to Course 151su., but in the organic field. Part of the summer practice required of juniors in Chemical Engineering during the summer between the third and fourth years; must be accompanied by Course 151su. (3 cred.; sr., grad.; prereq., 101; MTWThF I-IX, S I-IV; 90C.) B. F. Ruth.
- 301su.<sup>3</sup> Research in Chemical Engineering. (Cred. and hrs. ar.) R. E. Montonna.

<sup>2</sup> A laboratory fee of \$3 is charged for this course.

<sup>3</sup> A laboratory fee of \$5 is charged for this course.

## THE COLLEGE OF EDUCATION

Courses in the College of Education presuppose completion of junior 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 courses for which they have satisfied the prerequisites 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 regular bulletin of the College of Education, Part I. Students expecting to become candidates for a degree should seek as early as possible the advice of the major department concerned in order to learn the requirements of the special curriculum they will need to complete.

### GENERAL COURSE

208su. Methods in Educational Research. A study of the methods employed in treatment and presentation of educational problems. Designed to aid students in the preparation of theses. Suggested for all candidates for degrees. (2 cred.; grad.; MTWF III; 202Ed.) W. C. Olson.

### ART EDUCATION

#### FIRST TERM

#### FINE ARTS

See page 19 and special bulletin of information regarding a project in Fine Arts of interest to registrants in the Department of Art Education. The three o'clock lectures and demonstrations will be accredited in Art Ed. 7, 8, 9, 29, 30, 31.

Art Ed.1su. Fundamental Principles of Design. Elementary problems involving space breaking with parallel lines; emphasis on value relations; application to problems developed in the handicrafts. The decorative use of nature material. Inspiration from nature, not imitation of nature forms. (2 cred.; no prereq.; Sec. 1, MWF I, II; 307a OPh.; Sec. 2, MWF III, IV; 307b OPh.) Leah M. Hanley.

Art Ed.7su,8su,9su. Sketch from the posed figure in charcoal and pencil, with emphasis on action, form, and value relations. (1 cred. each; no prereq.; afternoon hrs. ar.; 203OPh.) Josephine Lutz.

Art Ed.29su,30su,31su. Sketch from Pose. Rhythmic expression, memory drawing, blackboard experience. (1 cred. each; prereq., 7, 8, 9; afternoon hrs. ar.; 203OPh.) Josephine Lutz, E. Harmes.

Art Ed.86su,87su,88su. Practice Teaching in Art. (1 cred. each; prereq., 9 cred. in design, 9 cred. in drawing, 6 cred. in handicraft; ar.) Leah M. Hanley.

## CRAFTS

*Important.*—Department approval of registration is required for crafts. If Design has not been completed it must be carried coincidently with any course in handicraft.

Register at table marked Art Education for the following courses:

- Art Ed.32su. Cardboard and Paper Construction. Boxes, toys, furniture, and other public school problems. (1 cred.; no prereq.; sections limited to 20 students; Sec. 1, WF V, VI; 207a OPh.; Sec. 2, TTh V, VI; 207a OPh.) Elsie Ober.
- Art Ed.33su. Bookbinding. Sequence of problems from simplest construction to the book sewed on cords or tapes. (2 cred.; no prereq.; Sec. 1, MWF III, IV; Sec. 2, TTh I, II, III; 10 OPh.) Elsie Ober.
- Art Ed.37su,38su. Elementary Weaving, Basketry, and Allied Crafts. (2 cred.; no prereq.; Sec. 1, MWF V, VI; Sec. 2, TTh V, VI, VII; 11 OPh.) Hilma Berglund.
- Art Ed.40su.<sup>1</sup> Advanced Weaving. Table and foot power looms. Sequence of problems from the simplest hand loom to the threading and use of four harness foot power loom. (2 cred.; prereq., 38 or equiv.; limited to 10 students; TTh lect., I; lab., II, III; 11 OPh.) Hilma Berglund.

## AGRICULTURAL EDUCATION

## FIRST TERM

## SPECIAL THREE-WEEK COURSES FOR AGRICULTURAL TEACHERS

By special arrangement, four courses, of three credits each have been divided into halves, A and B, each of three weeks' duration and each carrying 1½ credits. The maximum student load of these half courses during the three weeks' period, is three 1½-credit courses.

The four courses offered in summer, 1929, under these conditions, are:

Agricultural Education 161Asu. (See page 101.)

Agricultural Education 231Asu. (See page 101.)

Agronomy 125Asu. (See page 69.)

Dairy Husbandry 115Asu. (See page 70.)

These four courses will be offered during the first three weeks of the first term, June 18 to July 10. Credit in each of these "A" courses will be suspended until the student finishes the "B" portions of the same course. The "B" portions will be offered some time later. These four courses are scheduled to avoid conflicts with each other, so any student may take any three of them.

Courses to be offered in the three weeks' summer session period to teachers of agriculture in service.

Agr. Ed. 161Asu. Vocational Education in Agriculture. (Offered summer, 1929.) Vocational education as interpreted by current philosoph-

<sup>1</sup> A laboratory fee of \$1.50 is charged for this course.

- ical conceptions and theories. A study of the principles developed and established in agricultural education. Special emphasis on prevocational agriculture and vocational guidance. Lectures, discussions, and selected readings from the literature of each of the problems presented for discussion. (1½ credits on completion of Agr. Ed. 161B; MTWThFS IV; ar. See page 99.) A. V. Storm, A. M. Field.
- Agr. Ed. 231Asu. Theory and Practice of Teaching Agriculture. (Offered summer, 1929.) A special course designed for teachers in service in agriculture. A functional analysis of current problems in developing the course of study in agriculture, farm practice work, and evening school instruction. Modern trends in educational theory and practice treated to meet the peculiar needs of individual teachers. (1½ credits on completion of Agr. Ed. 231B; MTWThFS II; ar. See page 99.) A. V. Storm, A. M. Field.

## EDUCATIONAL ADMINISTRATION AND SUPERVISION

## FIRST TERM

- Ed.Ad.65su. The High School. For high school teachers in training. Recent growth in secondary education; types of reorganization; types of programs of study; types of high schools; plant; costs; standardization. (3 cred.; jr., sr.; prereq., Ed. 55; MTWThFS V; 204Ed.) O. R. Floyd.
- Ed.Ad.113. High School Curriculum. A study of methods of curriculum making, types of programs of study, curricula, subjects of study, constants, variables, electives, distribution of subject-matter by years and units. (2 cred.; sr., grad.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWTh VII; 210 OL.) G. N. Kefauver.
- Ed.Ad.119su. Elementary School Curriculum. A study of the scientific principles underlying curriculum making. Consideration will be given to a study of the results of scientific investigation in the various fields of the elementary school curriculum both as to content and organization. (3 cred.; sr., grad.; prereq., Ed. 1, 3; MTWThFS II; 205Ed.) F. W. Lathrop.
- Ed.Ad.124su.<sup>2</sup> Public School Administration. The organization, administration, and general support of public schools in state and local school districts. (3 cred.; sr., grad.; MTWThFS IV; 210OL.) I. M. Allen, F. Engelhardt.
- Ed.Ad.125su. Techniques in Administration. Standard practices regarding child accounting problems, records and reports; procedures having to do with personnel and school board relations and rules and regulations; standard office practices, including textbook and supply management. (3 cred.; sr., grad.; prereq., 124; MTWThFS I; 100OLa.) H. Otto.
- Ed.Ad.126su. School Plant Management. Plant program planning and financing, including operation and maintenance of public school build-

<sup>2</sup> Mr. I. M. Allen, superintendent of schools at Highland Park, Michigan, will teach this course for the first four weeks of the Summer Session.



- ings. (3 cred.; sr., grad.; prereq., 124; MTWThFS IV; 113Ed.)  
G. F. Womrath.
- Ed.Ad.133su. Guidance in Secondary Schools. Emphasizes practices in educational and vocational guidance in junior and senior high schools, considering such phases as giving information about vocations, utilizing test results and school marks, and organizing the staff for guidance. (2 cred.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWTh VI; 210OL.)  
G. N. Kefauver.
- Ed.Ad.150su.<sup>1</sup> Supervision and Improvement of Instruction. An analysis of the functions and duties of a supervisor as related to the improvement of instruction; specific supervisory technique; objective analysis of classroom activity; concrete application of present day problems; case studies. (2 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWTh VI; 100OLa.) L. J. Brueckner.
- Ed.Ad.151su.<sup>1</sup> Supervision: Uses of Educational Tests in Improving Instruction. Objective evaluation of the results of teaching; diagnosis of pupil difficulty; remedial work; tests as aids to teaching. (2 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWF III; 210OL.) H. P. Cooper.
- Ed.Ad.152su.<sup>1</sup> Supervision: The Adjustment of Schools to Individual Differences. The adaptation of the curriculum to the abilities and interests of pupils; methods of classification; emphasis upon classroom procedures. (2 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWF IV; 100OLa.) H. P. Cooper.
- Ed.Ad.153su. Supervision of English in the Elementary Schools. Improvement of instruction in oral and silent reading; the results of scientific investigation in reading; use of standardized and informal tests; remedial work; some consideration of spelling and writing. (2 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWF II; 113Ed.) W. E. Peik.
- Ed.Ad.155su. Supervision of Arithmetic in the Elementary Schools. The improvement of instruction in arithmetic; the evaluation of the course of study; standardized drill exercises; diagnosis of specific pupil difficulty and remedial work; tests as aids of teaching. (2 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWTh VII; 100OLa.) L. J. Brueckner.
- Ed.Ad.156su. Practice in Supervision—General. Practice in the techniques and supervision of instruction through classroom visitation and observation followed by conferences. Special investigation of related problems. (2 cred.; sr., grad.; prereq., 15 hrs. in ed. or equiv. and consent of instructor. Sec. 1, MF I, II ar.; Sec. 2, TF III, IV ar.) W. E. Peik, H. P. Cooper.
- Ed.Ad.164su. High School Administration. A study of the high school principalship, elimination from school, secondary vocational education, the marking system, record forms, classification of students, schedule of recitations, high school library, social organization and extra-cur-

<sup>1</sup> A laboratory fee of \$1 is charged for this course.

- ricular activities, community relationships, teaching schedule, building costs. (3 cred.; sr., grad.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWThFS IV; 205Ed.) C. W. Boardman.
- Ed.Ad.167su. Junior High School. A study of the special purposes of this institution and the appropriate reorganizations to achieve them; the history of the movement. (3 cred.; sr., grad.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWThFS II; 206Ed.) C. W. Boardman.
- Ed.Ad.175su.<sup>2</sup> Financial Aspect of Public School Business Administration. Financial program planning, budgeting accounting, cost finding, income and expenditure control; and the preparation and analysis of financial reports. (3 cred.; sr., grad.; prereq., 124-125; MTWThFS V; 210OL.) I. M. Allen, F. Engelhardt, H. J. Otto.
- Ed.Ad.205su. Seminar in Educational Administration. (1 cred.; grad.; prereq., Ed. 124-125-126, 150-151-152; last two weeks of Summer Session MTWThF VIII and ar.; 224OL.) F. Engelhardt.
- Ed.Ad.218su. Seminar in Secondary School Problems. (2 cred.; grad.; prereq., consent of instructor; MTWTh VIII; 210OL.) G. N. Kefauver.
- Ed.Ad.225su. Seminar in Elementary School Problems. Study of research techniques applied to elementary school problems. Candidates for the Master's degree who have not selected a thesis problem may enroll for credit. (2 cred.; grad.; prereq., consent of instructor; MTWTh VIII; 100OLa.) L. J. Brueckner.

## SECOND TERM

- Ed.Ad.65su. The High School. For high school teachers in training. Recent growth in secondary education; types of reorganization; types of programs of study; types of high schools; plant; costs; standardization. (3 cred.; jr., sr.; prereq., Ed. 55; MTWThFS II; 204Ed.) O. R. Floyd.
- Ed.Ad.113su. High School Curriculum. A study of methods of curriculum making, types of programs of study, curricula, subjects of study, constants, variables, electives, distribution of subject-matter by years and units. (3 cred.; sr., grad.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWThFS V; 204Ed.) G. N. Kefauver.
- Ed.Ad.119su. Elementary School Curriculum. A study of the scientific principles underlying curriculum making. Consideration will be given to a study of the results of scientific investigation in the various fields of the elementary school curriculum both as to content and organization. (3 cred.; sr., grad.; prereq., Ed. 1, 3; MTWThFS I; 210OL.) W. E. Peik.
- Ed.Ad.124su. Public School Administration. The organization, administration, and general support of public schools in state and local school districts. (2 cred.; sr., grad.; MTWTh V; 210OL.) F. Engelhardt.
- Ed.Ad.125. Techniques in Administration. Standard practices regarding

<sup>2</sup> Mr. I. M. Allen, superintendent of schools at Highland Park, Michigan, will teach this course for the first four weeks of the Summer Session.

- child accounting problems, records and reports; procedures having to do with personnel and school board relations and rules and regulations; standard office practices, including textbook and supply management. (2 cred.; sr., grad.; prereq., 124; MTWTh VI; 210 OL.) F. Engelhardt.
- Ed.Ad.133. Guidance in Secondary Schools. Emphasizes practices in educational and vocational guidance in junior and senior high schools, considering such phases as giving information about vocations, utilizing test results and school marks, and organizing the staff for guidance. (3 cred.; sr., grad.; prereq., 10 hrs. in ed. incl. Ed.Psy. 55; MTWThFS IV; 204Ed.) G. N. Kefauver.
- Ed.Ad.150su.<sup>1</sup> Supervision and Improvement of Instruction. An analysis of the functions and duties of a supervisor as related to the improvement of instruction; specific supervisory technique; objective analysis of classroom activity; concrete application of present day problems; case studies. (3 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWTh VI; MT VII; 205Ed.) L. J. Brueckner.
- Ed.Ad.151su.<sup>1</sup> Supervision: Uses of Educational Tests in Improving Instruction. Objective evaluation of the results of teaching; diagnosis of pupil difficulty; remedial work; tests as aids to teaching. (3 cred.; sr., grad.; prereq., Ed. 15 or equiv.; MTWThFS II; 113Ed.) H. J. Otto.
- Ed.Ad.155su. Supervision of Arithmetic in the Elementary Schools. The improvement of instruction in arithmetic; the evaluation of the course of study; standardized drill exercises; diagnosis of specific pupil difficulty and remedial work; tests as aids to teaching. (3 cred.; sr., grad.; prereq., Ed. 15 or equiv.; WTh VII, MTWTh VIII; 205Ed.) L. J. Brueckner.
- Ed.Ad.175su. Financial Aspect of Public School Business Administration. Financial program planning, budgeting, accounting, cost finding, income and expenditure control; and the preparation and analysis of financial reports. (2 cred.; sr., grad.; prereq., 124-125; MTWTh VII; 210OL.) F. Engelhardt.

## EDUCATIONAL PSYCHOLOGY

### FIRST TERM

- Ed.Psy.55su. Educational Psychology. A survey of fundamental facts of human behavior involved in educational activities. Open to juniors and seniors. (3 cred.; jr., sr.; prereq., 6 cred. in psy.; Sec. 1, MTWThFS II; 204Ed.; Sec. 2, MTWThFS V; OL.Aud.) Sec. 1, A. C. Eurich, Sec. 2, P. J. Rulon.
- Ed.Psy.55asu. Educational Psychology. Same as above. (2½ cred.; jr., sr.; prereq., 6 cred. in psy.; MTWThF VIII; 204Ed.) H. Sorenson.
- Ed.Psy.60su.<sup>1</sup> Introduction to Statistical Methods. To supply the statistical techniques necessary for an understanding of educational litera-

<sup>1</sup> A laboratory fee of \$1 is charged for this course.

- ture and for the pursuit of studies in education and related fields. The course includes a study of measures of central tendency, variability, and correlation. (3 cred.; jr., sr.; prereq., 6 cred. in psy.; Sec. 1, MTWThFS I; 204Ed.; Sec. 2, MTWThFS II; 112Ed.) Sec. 1, F. W. Lathrop; Sec. 2, P. J. Rulon.
- Ed.Psy.111su. Educational Diagnosis. The typical educational problems involving educational scales and standard tests. Nature of tests, methods of use, analysis of results obtained, and programs of remedial educational procedure based on the results of the tests. (3 cred.; jr., sr., grad.; prereq., Ed. 55 or equiv.; MTWThFS I; 101Ed.) M. J. Van Wagenen.
- Ed.Psy.116su. Advanced Statistical Methods in Education. A survey of statistical studies in education with special reference to the methods employed and the reliability of the results obtained. (3 cred.; sr., grad.; prereq., Ed.Psy. 60 or equiv.; MTWThFS II; 101Ed.) M. J. Van Wagenen.
- Ed.Psy.133su. Systematic Educational Psychology. Advanced course covering the field of psychology as related to education. Open to seniors and graduate students. (3 cred.; sr., grad.; prereq., 12 cred. in psy. and ed. psy.; MTWThFS V; 206Ed.) J. G. Rockwell.
- Ed.Psy.134su.<sup>2</sup> Mental Tests. Study of mental variation in children, its nature, degrees, causes, and effects. A laboratory course in the study of individual differences by means of mental tests. A critical study of group tests. Methods of treating superior and subnormal children in schools. (2½ cred.; jr., sr., grad.; prereq., Ed. 55; Sec. 1, MTWThF I, II; OLaAud.; Sec. 2, MTWThFS II, III; OLaAud.) V. H. Noll.
- Ed.Psy.\*144su.<sup>2</sup> Individual Mental Examination. For teachers of subnormal children. Demonstration and practice in mental diagnosis. Careful study will be made of different groups and systems of mental tests, and other clinical methods with discussion of general theory involved. (3 cred.; jr., sr., grad.; prereq., Ed. 55 or equiv.; MTWThF VI and ar.; 206Ed.) J. G. Rockwell.
- Ed.Psy.146su. Child Guidance. Specific problems in school adjustment dependent upon physical and emotional factors of the child, the home, and the environment. Case records giving family and personal histories, physical condition, psychometric rating, and personality study presented, class discussion of the recommendations. (3 cred.; prereq., Ed.Psy. 55 or equiv.; MTWThFS I; 205Ed.) H. E. Chamberlain.
- Ed.Psy.148su. The Problem Child in School. This course is designed to assist the classroom teacher in dealing with the personality, behavior, and scholarship difficulties of problem children. Lectures will be supplemented with an analysis of the experience of visiting teachers connected with the Commonwealth Program for the Prevention of Delinquency. (3 cred.; prereq., Ed.Psy. 55 or equiv.; MTWThFS II; 301Psy.) Gladys Hall.

<sup>2</sup> A laboratory fee of \$1.50 is charged for this course.

\* Both 143 and 144 must be completed before credit is given.

- Ed.Psy.149su.<sup>1</sup> Psycho-Educational Clinic. Conducted in co-operation with the Department of Sociology and the Medical School clinics in pediatrics and nervous and mental diseases. Students will receive systematic instruction in giving psychological examinations and in scientific interpretation of data. (2 cred.; jr., sr., grad.; prereq., Ed. 134-135-136 or equiv.; ar.) W. C. O'son.
- Ed.Psy.159su. Psychology of Personality. Theoretical basis. Survey of methods for the measurement and study of character and the emotions. Relation to school success and other factors in the school situation. Genetic development of personality traits in childhood and adolescence. Methods in education for social and emotional stability—preventive and remedial programs. Place of the teacher. (2 cred.; sr., grad.; prereq., Ed. 55 and 116 or 134 or parallel; MTWTh II; 111Ed.) W. C. Olson.
- Ed.Psy.191su. Individual Differences. A study of group and individual differences and their relations to educational practice. (3 cred., sr., grad.; prereq., Ed.Psy. 55 and 60 or equiv. and permission of instructor; MTWThFS I; 206Ed.) A. C. Eurich.
- Ed.Psy.195su. Seminar on the Problem Child in School. An intensive study of case histories of pupils referred by the schools to visiting teachers. (3 cred.; prereq., Ed.Psy. 55, or equiv.; MTWThFS V; 301Psy.) Gladys Hall.

## SECOND TERM

- Ed.Psy.55su. Educational Psychology. (For course description, see First Term, Course 55.) (3 cred.; jr., sr.; prereq., 6 cred. in psy.; MTWThFS I; OLaAud.) V. H. Noll.
- Ed.Psy.111su. Educational Diagnosis. For course description, see First Term. (3 cred.; jr., sr.; prereq., Ed. 55 or equiv.; MTWThFS I; 111Ed.) M. J. Van Wagenen.
- Ed.Psy.115su. Psychology of Elementary School Subjects. A discussion of the research studies in the field of the psychology of elementary school subjects. (3 cred.; jr., sr.; grad.; prereq., 10 cred. in psy. and ed. MTWThFS II; 111Ed.) M. J. Van Wagenen.
- Ed.Psy.134su. Mental Tests. For course description, see First Term. (2½ cred.; jr., sr., grad.; prereq., 55 or equiv.; MTWThFS II, III; OLaAud.) V. H. Noll.
- Ed.Psy.\*143su.<sup>2</sup> Individual Mental Examination. For course description, see First Term, Course 144. (3 cred.; jr., sr., grad.; prereq., Ed. 55 or equiv.; MTWThF VI and ar.; 113Ed.) J. G. Rockwell.
- Ed.Psy.184su. Mental Deficiency. Survey of mental deficiency in children and adults. Physical traits including study of brain defects, causes and heredity; psychology of mental deficiency; social problems of feeble-mindedness. (3 cred.; sr., grad.; prereq., Ed. 55 or equiv.; MTWThFS V; 113Ed.) J. G. Rockwell.

<sup>1</sup> A laboratory fee of \$1 is charged for this course.

<sup>2</sup> A laboratory fee of \$1.50 is charged for this course.

\* Both 143 and 144 must be completed before credit is given.

## CONTEMPORARY PSYCHOLOGY

James Drever, The University, Edinburgh, Scotland

F. Roels, University of Utrecht, Utrecht, Holland

Wolfgang Koehler, Berlin

F. Aveling, London, England

L. Wynn-Jones, University of Leeds, Leeds, England

R. H. Thouless, Psychological Laboratory, University, Glasgow

The distinguished psychologists named above will conduct a combined course in Contemporary Psychology. Each instructor will be at the University for one week. Lectures will occur at eleven o'clock each morning in the auditorium of the Old Library. These lectures will be open to persons who are registered in the Summer Session who may attend this course of lectures as auditors. This course will not, in itself, carry credit. Students qualified to pursue advanced work and who attend these lectures will be admitted to afternoon conferences to be held at four o'clock on each day at a place to be arranged.

Students who pursue satisfactory work in the conferences and who also attend the morning lectures will be given five credits. Students who attend the afternoon conferences only may earn two and one-half credits.

Conditions for entrance to the afternoon conference will be as follows:

a. Attendance at the morning lectures unless excused by instructor in charge of the course.

b. Previous study in psychology to the amount of twelve quarter credits.

c. Approval by instructor in charge of the course.

Assistant Professor Herbert Sorenson will be in charge of all arrangements for the course in Contemporary Psychology.

## HISTORY OF EDUCATION

## FIRST TERM

H.Ed.3su. Educational Sociology. A study of education as a means of solving social problems and directing the evolution of institutions. (3 cred.; jr., sr.; prereq., 6 cred. in psy.; MTWThFS IV; OLaAud.) H. S. Tuttle.

H.Ed.101su. Foundations of Modern Education. Historical analysis and interpretation of the more important elements in modern education derived from the Hebrews, Greeks, Romans, Middle Ages, and Renaissance. (3 cred.; jr., sr., grad.; prereq., 6 cred. in psy. and 6 cred. in hist.; MTWThFS IV; 204Ed.) Jean H. Alexander.

H.Ed.105su. Public Education in the United States in the Nineteenth Century. Institutions, theories and problems of American elementary and secondary education in the light of history. Emphasis upon rise of state school systems, the influence of great educators, and development of method. (3 cred.; jr., sr., grad.; prereq., 6 cred. in psy. and 6 cred. in hist.; MTWThFS V; 205Ed.) Jean H. Alexander.

- H.Ed.187su. Seminar in Educational Sociology. The sociological foundations of educational theory will be discussed with the investigation of specific problems. Lectures, readings, and problems. (3 cred.; sr., grad.; prereq., consent of instructor; MTWThFS V; 113Ed.) H. S. Tuttle.

## HOME ECONOMICS EDUCATION

## FIRST TERM

## UNDERGRADUATE COURSES

- H.E.Ed.42su.<sup>1</sup> Special Methods of Teaching Home Economics. Curricula, equipment, methods of teaching for home economics. (5 cred.; jr., sr.; prereq., 13, 22, Psy. 1 and 2, Agr. Ed. 11 or Ed. Psy. 55; MTWThF VII, VIII; 213HE.) Ella J. Rose.

## GRADUATE COURSES

- H.E.Ed.142su. Educational Measurement in Home Economics. Survey of accomplishment in this field; evaluation and construction of objective tests. (2 cred.; sr.; prereq., 42, Ed. Psy. 55; MWFS III; 213HE.) Clara M. Brown.
- H.E.Ed.143su. Home Economics Curricula. A study of the objectives of home economics in the junior and senior high schools; organization of curricula. (2 cred.; jr., sr., grad.; prereq., 42 or parallel; MTF III; 213HE.) Clara M. Brown.
- H.E.Ed.145su. Administration and Supervision of Home Economics. (3 cred.; jr., sr., grad.; ar.) Ella J. Rose.
- H.E.Ed.147su.\* Organization and Methods for Related Art Teaching. Organization of a related art course and methods of teaching art principles as applied to familiar objects and processes. (3 cred.; jr., sr.; prereq., 42 or parallel, H.E. 53, 131 or parallel; MWF VI, VII; 313HE.) Harriet Goldstein.
- H.E.Ed.149. Research Problems. A study of the methods used in collection, treatment, and interpretation of data in the field of home economics. (Cred. ar.; sr., grad., permission of instructor; ar.) Clara M. Brown.

## INDUSTRIAL EDUCATION

## FIRST TERM

- Ind.11su.<sup>2</sup> Special-Class Woodwork. For teachers of art, subnormal, and primary work. (Not open to those who already have credits in bench woodwork or cabinet making.) Lectures, demonstrations, and shop practice. Flat-piece work, assembled and movable-part toys, models, etc. Special attention to wood finishing. (2 cred.; no prereq.; Sec. A, MTW VII, VIII and W IX; Sec. B, ThF VII, VIII, IX and W IX.) W. W. Sturtevant.

<sup>1</sup> Prerequisites waived for teachers of home economics.

<sup>2</sup> A laboratory fee of \$1.50 is charged for this course.

\* This course is of special interest to those taking work in fine arts.

- Ind.14su. *Methods of Teaching Drawing.* The selection and organization of course materials, methods of presentation, lesson plans and devices, evaluation of texts, testing, grading. Not a course in drawing. (2 cred.; prereq., 10 cred. in drawing or consent of instructor; TWThF VI.) W. W. Sturtevant.
- Ind.60su. *Social Agencies in Education.* An evaluation of various social agencies that make educational contributions; their status, aims, achievements, and deficiencies; their relationships and possible fields of co-operation. The special significance of social agencies to vocational education under public support and control. (2 cred.; no prereq.; TWThF II.) R. T. Craigo.
- Ind.66su. *Methods in Related Subjects.* Theory, practices, and problems of related instruction; special reference to mathematics, drawing, science, and safety; group study and unit courses considered; usable methods and the means of supervision. Both incidental and scheduled teaching discussed. (2 cred.; prereq., Ind. 40; TWThF IV.) H. J. Smith.
- Ind.70su. *Methods in Shop Subjects.* Various methods of conducting shop classes, with and without reference to production work; lesson plans, grading, reports, and records; the assigning of jobs and shop management; standards of workmanship. (2 cred.; prereq., Ind. 40; TWThF I.) H. J. Smith.
- Ind.110su. *Guidance in the Schools.* The history of the guidance movement; typical public school means and methods; the presentation of occupational information; the junior wage earnings situation; attendance and child labor laws; guidance, placement, and follow-up plans. (2 cred.; jr., sr., grad.; prereq., Ed.Psy. 134; MTWF III.) H. J. Smith.
- Ind.172su. *Administration of Industrial Education—Part Time School's.* A study of the new movement for part time education. Social and economic background, methods of organizing classes, a study of the special student groups, courses of study. Typical schools, comparative state legislation and plans. Minnesota's problems. (2 cred.; jr., sr., grad.; prereq., Ind. 170, 171; TWThF IV.) M. R. Bass.
- Various shop and drawing courses. Arranged by H. J. Smith.

Shop and drawing courses, in wide variety, are offered in the engineering buildings of the University and students are referred to the sections of this bulletin wherein these are described.

The Department of Industrial Education is interested, particularly, in courses to be offered by the Department of Mechanical Engineering—in the woodworking and the metal working fields. These two subjects will be considered broadly, under a flexible schedule. Those in training for teaching industrial subjects will be privileged to take work closely matching their individual needs.

A copy of the four-year curriculum in Industrial Education, leading to the bachelor of science degree, will be mailed upon request. This should be used in selecting required and elective courses in this and other departments of the college and the University. Correspondence with reference to credit evaluation, program, graduate work, etc., should be addressed to Mr. Homer J. Smith, 222 Old Library.



## SUMMER SESSION

## SECOND TERM

There will be no special offering of lecture courses in Industrial Education during the second term. There will, however, be opportunity for those working toward the degree to earn required credits in English, economics, psychology, educational psychology, sociology, technique of teaching, educational administration, and mental tests. Before the close of the first term Mr. Smith will be pleased to advise those who desire to enroll for work in the second.

## PUBLIC SCHOOL MUSIC

## FIRST TERM

- Mu.Ed.29su. Public School Music for the Grades. Grade methods in music. (3 cred.; jr., sr.; no prereq.; MWF I-II; Mu.) A. N. Jones.
- Mu.Ed.32su. Public School Music for High Schools. High school methods. (3 cred.; jr., sr.; prereq., 75; MWF III-IV; Mu.) A. N. Jones.
- Mu.Ed.64su. Orchestra Conducting. Theory and practice of general principles of conducting. Technique of baton and elements of interpretation. (2 cred.; jr., sr.; prereq., consult instructor; lab. TTh I; lect. S I; 4Mu.) (Observe summer school orchestra.) A. Pepinsky.
- Mu.Ed.71su.<sup>1</sup> Class Instrument Teaching. Three classes, string, wood winds, and brass and percussion. Students may enter any or all classes. The course will contain drills, methods, and material for use in class instrument teaching in the public schools. (1 cred. each; strings, TS II; wood winds, TS III; brass, TS IV; 4Mu.) A. Pepinsky.
- Mu.Ed.94su. Ensemble. Chamber music, duos, trios, and quartets and other larger combinations for strings and wind instruments. For students of piano, violin, organ, etc. Sight reading, accompanying, and ensemble playing. (2 cred.; jr., sr.; prereq., consult instructor; TTh VI, VII; 3Mu.) A. Pepinsky.

## SCHOOL HEALTH WORK

The summer session courses which are part of the four-year curriculum in School Health Work, offered by the Department of Preventive Medicine and Public Health are as follows:

- PM&PH 53. Elements of Preventive Medicine.
- PM&PH 69. School Nursing. Principles, techniques, and practices.
- PM&PH 80. Health Supervision of the School Child.

For further description of these courses see statement listed under the Department of Preventive Medicine and Public Health in this bulletin. For a full description of the four-year curriculum in School Health Work see College of Education bulletin, Part I, pages 51 to 53.

<sup>1</sup> The three subjects may be taken concurrently.

## THEORY AND PRACTICE OF TEACHING

## FIRST TERM

- Ed.T.14su. Teaching Junior High School Mathematics. For students prepared to teach mathematics in the junior high school. Discussion of the course of study and methods of presentation. (2 cred.; jr., sr.; prereq., Ed. 15; TWThF VII; 206Ed.) C. N. Stokes.
- Ed.T.15su.<sup>1</sup> Technique of High School Instruction. Types of classroom exercises; preparation of teaching plans; hygiene of instruction; methods of treating individual differences; classroom management; professional ethics of teaching; supervised study; marking system; observation of high school work. (3 cred.; prereq., Ed. 55; MTWThFS 100 OLa.) E. Hudelson, J. G. Umstaddt.
- Ed.T.16su.<sup>2</sup> Practice Teaching. Teaching under supervision in the Minneapolis and St. Paul city schools, in regular academic secondary school subjects. Limited to students who have completed the course in special methods. (3 or 5 cred.; sr., grad.; prereq., Ed. 15, Special Methods Course, and consent of instructor; ar.) Mabel Holmberg.
- Ed.T.17su.<sup>2</sup> Practice Teaching. A practice course in teaching subnormal children. Students will have opportunity to observe work with special classes, and to teach under direction of the instructor. Conducted in co-operation with the public schools of Minneapolis and St. Paul. (2½ cred.; jr., sr.; MTWFS II, III, IV; ar.) Mae Bryne.
- Ed.T.21asu. Teachers' Course in English Composition. (2 cred.; jr., sr.; prereq., Ed. 15; TWThF VI; 112Ed.) Rewey Belle Inglis.
- Ed.T.21bsu. Teachers' Course in English Literature. (2 cred.; jr., sr.; prereq., Ed. 15; TWThF VII; 112Ed.) Rewey Belle Inglis.
- Ed.T.30su. Principles of Kindergarten and Nursery School Education. The development, aims, and organization of kindergarten and nursery school education. A consideration of the curriculum and methods to be employed. (3 cred.; jr., sr.; prereq., C.W. 80; MTWTh VII, F VI-VII; 202OLa.) Josephine C. Foster.
- Ed.T.31su. Permanent Play Materials. A consideration of the various kinds and types of permanent play materials (blocks, dolls, trains, wagons, etc.) and their use by children of different ages. (2 cred.; jr., sr.; prereq., Psy. 1-2; MTWTh VIII; 202OLa.) Josephine C. Foster.
- Ed.T.34su. Story Telling for Young Children. A study of folk, fairy, here-and-now stories and poetry suitable for young children. The principles underlying story telling, the selection of the story, and versions. The educational importance of conversation with the child. (2 cred.; jr., sr.; prereq., Ed.T. 30; MTWTh VI; 202OLa.) Keith E. Headley.
- Ed.T.37su. Social Science for Senior High Schools. Selection and organization of content, preparation and presentation of data, and methods

<sup>1</sup> A laboratory fee of \$1 is charged for this course.

<sup>2</sup> A laboratory fee of \$1 per credit hour is charged for this course.

- of teaching. Required of all students whose major is social science. (2 cred.; jr., sr.; prereq. in each of the following: pol. sci., econ., sociol., either American History or Modern European History and Ed. 15; TWThF VII; ar.; 202Ed.) L. H. Tohill.
- Ed.T.45su. The Teaching of Geography and History in the Elementary School. The aims and purposes controlling instruction in geography and history in the elementary school; tendencies toward standardization, special emphasis on problem studies. (2 cred.; jr., sr.; MTWF V·111Ed.) Frances Dearborn.
- Ed.T.50su. Teaching of Composition in the Junior High Schools. Importance of classroom presentation in realizing the aims of composition teaching. Project motivation. Group method. The place of grammar, punctuation, and spelling. (2 cred.; jr., sr.; prereq., Ed. 15; MTWF III; 101Ed.) Dora V. Smith.
- Ed.T.51su. Teaching of Literature in the Junior High Schools. Differentiated purposes in reading and literature. Methods of classroom presentation. Group and project method in extensive reading. Illustrative material, testing. (2 cred.; jr., sr.; prereq. Ed. 15; MTWF IV; 101Ed.) Dora V. Smith.
- Ed.T.54su. Teaching Secondary School Mathematics. For students preparing to become teachers of secondary school mathematics. Lectures, readings, discussions, methods of presenting courses of study in general mathematics, algebra, and geometry. (4 cred.; jr., sr.; prereq., Ed. 15, Math. 50; TWThF VIII, IX; 112Ed.) C. N. Stokes.
- Ed.T.56su. Teachers' Course in History. Deals chiefly with the practical problems of teaching history and government in the secondary schools. (4 cred.; jr., sr.; prereq., Ed. 15, 18 cred. in hist. including one intensive course; TWThF VIII, IX; 202Ed.) L. H. Tohill.
- Ed.T.62su. The Teaching of High School Science. A study of present conditions in the teaching of science, with tendencies in progress, together with the organization and best methods of presenting science courses. Practical problems in science teaching and their solution. (4 cred.; jr., sr.; prereq., Ed. 15 and consent of instructor; MTWTh VII, VIII; 6aOLa.) A. W. Hurd.
- Ed.T.65su. The Teaching of High School Physics. Treats of the organization of the course, desirable methods, and content; place of the laboratory, demonstration, and recitation; choice of texts and manuals, equipment, how to care for individual differences, testing, marking, etc. (2 cred.; jr., sr.; prereq., Ed. 15 and consent of instructor; MTWTh VI; 6aOLa.) A. W. Hurd.
- Ed.T.79su. Teachers' Course in Speech. Theoretical and practical aspects of the teaching of courses in fundamentals of speech, debate and argumentation, interpretative reading, dramatic production. Class discussions, reports, outlines of courses. (3 cred.; prereq., 41-42-43 or 45-46; MTWThF and 1 hr. ar.; 308F.) F. L. D. Holmes.
- Ed.T.80su. Teachers' Course in Commercial Subjects. The object of this course is to offer students who plan to teach commercial subjects an

- opportunity to study methods of teaching shorthand, typewriting, book-keeping, and other business subjects generally taught in high school. (3 cred.; jr., sr.; prereq., Ed. 15 and consent of instructor; MTWThF VI and W VII; 102B.) Ernestine Donaldson.
- Ed.T.143su.<sup>1</sup> The Teaching of Reading. Emphasis upon a study of the present content, materials of instruction, and teaching procedures in lower, intermediate, and upper grade reading; a survey of the contributions of research; class and individual projects. Classroom observation of reading. (2 cred.; jr., sr., grad.; prereq., 9 hrs. in ed. incl. Ed. Psy. 55; MTWF III; 111Ed.) Frances Dearborn.
- Ed.T.173su. Methods in Character Education. A study of the present trends and methods in the teaching of character education. (2 cred.; sr., grad.; prereq., Ed. Psy. 55 or permission of instructor; MTWF IV; 111Ed.) Frances Dearborn.
- Ed.T.185su. Investigation of Problems in Teachers' Training. A survey of practice and of the problems relating to the institutional and in service training of teachers; recent investigations and findings; selected problems; individual projects. Intended for normal training directors, critic teachers, and supervisors, and for others interested in the problems of the professional training of teachers. (2 cred.; sr., grad.; prereq., 15 hrs. in education and permission of instructor; MTWF I; 113Ed.) W. E. Peik.
- Ed.T.193su. Foundations of Secondary School Methods. A study of the investigations which form the bases of the technique of high school instruction and the application of their results to high school subject-matter and to high school classroom procedure. (2 cred.; sr., grad.; prereq., Ed. 15; MTWF III; 100OLa.) E. Hudelson.
- Ed.T.196su. Problems of High School English Literature Teaching. (2 cred.; sr., grad.; prereq., Ed. T. 15 and 21; MTWF; 101Ed.) Dora V. Smith.
- Ed.T.222su. Research Problems in Secondary School Methods. (2 cred.; grad.; prereq., Ed. 15 and 113; ar.; 216OL.) E. Hudelson.

## SECOND TERM

- Ed.T.15su.<sup>1</sup> Technique of High School Instruction. For course description, see First Term. (3 cred.; prereq., 55; MTWThFS I; 204Ed.) J. G. Umstattd.
- Ed.T.143.<sup>1</sup> The Teaching of Reading. Emphasis upon a study of the present content, materials of instruction, and teaching procedures in lower, intermediate, and upper grade reading; a survey of the contributions of research; class and individual projects. Classroom observation of reading. (3 cred.; jr., sr., grad.; prereq., 9 hrs. in ed. incl. Ed. Psy. 55; MTWThFS II; 210 OL.) W. E. Peik.

<sup>1</sup> A laboratory fee of \$1 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, and running track will be available to students in the Summer Session.

#### FIRST TERM

- A. General Exercise. Volley ball, baseball, handball, playground ball, basket-ball, tennis, golf, horseshoes, gymnastic games. No registration required. Open to students and faculty. (No cred.; all; no prereq.; MTWThF IX; A.)
- B. General Swimming. No instruction. No registration required. (No cred.; all; no prereq.; MTWThF, Sec. 1, V; Sec. 2, IX; Sec. 3, X; A.) N. Thorpe.
- 13su. Elementary Swimming. Individual instruction for those who cannot swim. (No cred.; all; no prereq.; MTWThF IV; A.) Mr. Thorpe.
- 14su. Intermediate Swimming. Individual instruction given. (No cred.; all; no prereq.; MTWThF VII; A.) N. Thorpe.
- 15su. Advanced Swimming. For teachers and coaches. Instruction in form and speed swimming, diving, plunging, water sports, life saving. By special arrangement with instructor credit for Phys. Ed. 10 can be received for this course. (1 cred.; soph., jr., sr.; no prereq.; MTWThF, VIII; A.) N. Thorpe.
- 19su. Elementary Gymnastics. Tactics, free exercise, tumbling and apparatus work, suitable for upper grades and high schools, in the school-room and the gymnasium. (1 cred.; jr., sr.; no prereq.; MTWThF VII; A.) D. MacMillan.
- 20su. Intermediate Gymnastics. Continuation of Course 19su. Progressive exercises in calisthenics, apparatus, and gymnastic dancing. (1 cred.; prereq., 19su; MTWThF VIII.) D. MacMillan.
- 28su. Physical Examination and Normal Diagnosis. Methods of inspection to determine deviations from the normal, including posture, musculature, skin, genitals, and feet; tests of hearing and vision; inspection of nose, throat, and teeth; examination of heart and lungs; methods of taking principal measurements, such as height, weight, girth, strength tests, etc. (2 cred.; TWThF III; A.) L. J. Cooke.
- 29su. Orthopedic and Remedial Gymnastics. Lectures on the theories governing the correction of physical and organic defects such as posture, flat feet, heart weakness, etc. Practice in handling classes and in executing the various remedial activities. (2 cred.; no prereq.; TS I, M II-III; A.) L. J. Cooke.
- 30su. Athletic Training and First Aid. Principles governing conditions 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.; MWThF I; A.) L. J. Cooke.
- 33su. Organization and Administration of Physical Education and Athletics. Problems of organization, administration, and supervision. Arrangement of programs in athletics, gymnastics, calisthenics, and other physical education activities. Discussion of place of athletics in the program, schedule making, construction, equipment, and care of gymnasium and athletic fields. (2 cred.; TWThF II.) F. W. Luehring.
- 37su. Football. Lectures on history, rules and theory, strategy and generalship, styles of attack and defense, methods of organizing practice and handling men, development of team spirit, officiating. Demonstrations and practice in the technique of position, play, and mechanics of football fundamentals. (3 cred.; sr.; no prereq.; MTWThFS 6:00 to 8:00 a.m.; three-week course; Field House.) C. W. Spears, A. J. Bergman.
- 38su. Basket-Ball. Lectures and rules, styles of offense and defense, the conditioning and handling of a team. Practice in fundamentals of footwork, passing, dribbling, goal throwing, etc. (2 cred.; no prereq.; MTWThF IX and X; Field House; three-week course.) D. MacMillan.
- 39su. Track Athletics. Instruction and practice in the standard track and field events. Lectures on conduct of meets, rules of competition, officiating, track strategy, regulation of practice, and preparing contestants for competition. (2 cred.; no prereq.; sr.; MTWThF IV; A.) A. J. Bergman.
- 42su. Baseball. Theoretical consideration of, and actual practice in, batting, base running, and methods of playing each position. Special attention to "inside baseball" and development of team play. (2 cred.; no prereq.; sr.; MTWThF VI.) A. J. Bergman.

SECOND TERM

- A. General Exercise. See Course A above. (No cred.; all; MTWThF IX; A.)

PHYSICAL EDUCATION FOR WOMEN

Courses 1, 2, 11 and 12 are open also to men.

For hours when the swimming pool will be open for incidental use see Course 30.

The playground at Van Cleve Park, Fifteenth Avenue S.E. and Como Avenue, will be used for demonstration and practice purposes in connection with Course 2.

Except for courses in which shower bath fees are charged, students may procure shower bath tickets from the matron at 10 cents apiece or at the rate of twelve for one dollar.

Certain courses carry credit toward the teacher's certificate in physical education. See Courses 2, 3, 4, 5, and 6.

Students desiring to enroll in Intermediate or Advanced Swimming or Technique of Swimming Strokes must pass a test before registering. Test will be conducted on registration days.

#### FIRST TERM

- 1su. Teachers' Course in Physical Education for Schools. Open also to men. The technique is planned to help both those who are, and those who are not, accustomed to some other method. The practical part of the course will include innovations in content and methods of teaching gymnastics. Portion covering practical work alone may be taken for  $\frac{1}{2}$  of 1 credit. Shower bath fee, \$1.50. (2 cred.; no prereq.; MTWFS III-IV; 201,153WGm.)
- 2su. Teachers' Course in Play. Open also to men. Brief consideration of the nature and function of play, and adaptation to various groups of children and adults; folk dances, technique, rules and practice of games for boys and girls of Grades I-VI and girls of junior high school age; observation and practice teaching on playground. This course carries university credit for Physical Education 43-44-45 if preceded by specified prerequisites. Portion covering practical work in folk dances and games may be taken alone for  $\frac{1}{2}$  of one credit. Shower bath fee, \$1.50. (4 cred.; no prereq.; lect., MTWFS I; games and folk dancing, MTWFS II; practice teaching, MTWThF VII; 201, 151WGm.) Florence Warnock.
- 3su. Interpretive Dancing. An art and a phase of physical education designed to develop a sense of beauty and body control through rhythmic movements prompted by the imagination. Open to all women for recreation. If preceded by specified prerequisites it carries university credit for Physical Education 13 or 66. Shower bath fee, \$2.00. (1 cred.; no prereq.; MTWFS II; 153WGm.) Mildred Greenberg.
- 4su. Technique and Teaching of Basket-Ball. Lectures on rules, technique of play, and methods of teaching. Practice in fundamentals of the game. Course carries university credit for Physical Education 64, if preceded by specific prerequisites. Shower bath fee \$1.50. (1 cred.; no prereq.; lect., MF IV; lab., TWS IV; 151WGm.) Winona Jones.
- 5su. Technique and Teaching of Baseball. Lectures on rules, technique of play, and methods of teaching. Practice in fundamentals of the game. Course carries university credit for Physical Education 65, if preceded by specific prerequisites. Shower bath fee, \$1.50. (1 cred.; no prereq.; lect., MTh VI; lab., TWF VI; 201,151WGm.) Florence Tenney.
- 6su. Technique and Teaching of Archery, Soccer, and Volley Ball. Lectures and discussions on rules, technique of play, and methods of teaching. Practice in fundamentals of the games. Course carries university credit for Physical Education 60, if preceded by specific prerequisites. Shower bath fee, \$1.50. (1 cred.; no prereq.; lect. MTh I; lab. TWFS I; 151,201WGm.) Winona Jones.

- 7su. Tennis. Class instruction for both those who are and for those who are not familiar with rules and fundamental technique. (No cred.; no prereq.; Sec. 1, MWF II; Sec. 2, MWF VII; Sec. 3, TTh VII; 151WGM.) Florence Tenney.
- 8su. Golf for Beginners. Sections limited to 20. (No cred.; no prereq.; Sec. 1, TS I; Sec. 2, TS II; Sec. 3, TS III; Sec. 4, WF I; Sec. 5, WF II.) Winona Jones, Mildred Greenberg.
- 11su. Administration and Supervision of Physical Education. Problems of organization, administration, and supervision in grades and high schools. Practice in supervision will be included wherever possible. (2 cred.; no prereq.; Th II, MTWS III, MTWThS IV; 201WGM.) Eleonore G. Adams.
- 12su. Anatomy and Kinesiology. Study of joint mechanisms and muscle actions as related to gymnastics and games. Analysis of typical exercises for correction of postural defects. (2 cred.; no prereq.; MTWThFS II; 201WGM.) Grace E. Denny.
- 30su. General Swimming. No registration necessary. (No cred.; no prereq.; MWF 12:00-12:30; MF 1:30-2:00; 51WGM.) Mildred Greenberg, Florence Tenney.
- 31su. Elementary Swimming. Intensive course to pass off swimming requirement of the department. Class instruction given. Shower bath fee, \$1. Sections limited to 25. (No cred.; prereq., phys. exam.; Sec. 1, MW IV; Sec. 2, TF IV; 51WGM.) Helen Starr, Florence Tenney.
- 32su. Elementary Swimming. Class instruction given. Shower bath fee, \$1.50. Sections limited to 25. (No cred.; prereq., phys. exam.; Sec. 1, MWF III; Sec. 2, MWF 11:30; Sec. 3, MWF VII; Sec. 4, MWF 2:30; 51WGM.) Helen Starr, Mildred Greenberg.
- 33su. Intermediate and Advanced Swimming. Class instruction given. Class will be divided into intermediate and advanced section as result of test. Shower bath fee, \$1. (No cred.; prereq., swim. test, phys. exam.; Sec. 1, TTh VII; Sec. 2, TTh 2:30.) Helen Starr.
- 35su. Technique of Swimming Strokes. Technique of swimming, diving, and life saving. Shower bath fee, \$1. (No cred.; prereq., swim. test, phys. exam.; TTh VI; 51WGM.) Helen Starr.

## SECOND TERM

- 6su. Tennis for Beginners. (MWF II.) Helen Starr.
- 8su. Golf for Beginners. (MWF III.) Helen Starr.
- 30su. General Swimming. (MWF V.) Helen Starr.
- 32su. Elementary Swimming. (MWF IV.) Helen Starr.
- 33su. Intermediate Swimming. (MWF VII.) Helen Starr.



# THE 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 pre-business courses, either in the College of Science, Literature, and the Arts, the College of Agriculture, Forestry, and Home Economics, or the College of Engineering. 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 ninety 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 pre-business 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.

Special arrangements have been made for students preparing to teach commercial subjects. This group of courses will be found in the College of Education bulletin, Part I, pages 26 and 27, under the title, "Commercial Education."

### FIRST TERM

- 3su. The Mechanism of Exchange. Elementary course in money and banking. Study of financial institutions, their functions, and their place in the economic organization. (3 cred.; no prereq.; MTWThFS II; 202B.) W. R. Myers.
- 6su. Principles of Economics (elementary course). Principles that underlie the present industrial order with reference to production and consumption. Application of these principles to corporations and trusts, with a brief study of money and banking. (3 cred.; no prereq.; soph., jr., sr.) Sec. 1, MTWThFS I; 102B. J. L. O'Hara. Sec. 2, MTWThFS IV; 102B. R. A. Graves.
- 14su. Elements of Statistics. Elementary principles of classification, analysis, and presentation of statistical materials, with primary emphasis on economic data. Lectures, readings, and laboratory work. (3 cred.; prereq., 4 or 6-7; soph., jr., sr.; MTWFS III and one hr. ar.; 302B.) R. A. Graves.
- 25su. Principles of Accounting. A course presenting the principles underlying the preparation of statements and the keeping of accounts. Prin-

- principles of adjusting, closing the books, use of work sheet, partnership procedures, corporation stock accounts, surplus, and reserves. (3 cred.; soph., jr., sr.; prereq., 20 or a previous course in bookkeeping. MTWThFS I; 302B.) E. A. Heilman.
- 30su. Secretarial Training: Shorthand. This is a very intensive course in elementary Gregg shorthand. Recent educational methods will be observed in teaching the most used shorthand forms. (4 cred.; soph., jr., sr.; no prereq.; MTWThFS V and MT VII; 1B.) Ernestine Donaldson.
- 32su. Secretarial Training: Typewriting. This intensive course for beginners is to give a practical knowledge of typewriting. The course includes learning the keyboard, writing connected matter, and arranging letters. (1 cred.; soph., jr., sr.; no prereq.; MTWThF VI and five hrs. ar.; 1B.) Ernestine Donaldson.
- 85su. Economics of Marketing. 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. Required course in commercial education sequence. (3 cred.; soph., jr., sr.; prereq., 4 or 6-7; MTWThFS IV; 202B.) R. S. Vaile.
- 86su. Office Organization and Management. Organization and administration of office activities; layout of the office; development of standard procedure and routines in clerical work including labor saving methods and devices; co-ordination and control of office production; relation of office work to other productive activities and departments in modern business concerns. Required course in commercial education sequence. (MTWFS III and one hr. ar.; 102B.) J. L. O'Hara.
- 101su. Advanced General Economics. (Value and distribution.) An advanced course in economic theory, prices and costs; the value theory. For the Summer Session this course is the equivalent of Course 103. (3 cred.; prereq., 4 or 6-7; jr., sr., grad.; MTWThFS V; 202B.) R. S. Vaile.
- 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. The use of budgets in business. Accounting methods and statements in a number of business fields. Required course in commercial education sequence. (3 cred.; jr., sr., grad.; prereq., 25-26; MTWThFS II; 302B.) E. A. Heilman.
- 141su. Monetary and Banking Policy. Advanced course in money and banking. Public policies relative to the banking organization, efficiency, and safety of financial operations, stabilization of the price level, prevention of undue financial concentration, subsidizing certain economic groups. Required course in commercial education sequence. (3 cred.; prereq., 3, and 4 or 6-7; jr., sr., grad.; MTWThFS I; 202B.) A. W. Marget.
- 149su. Business Cycles. American business conditions since 1890 with regard to the great cycles of alternate prosperity and depression, and financial panics. Critical examination of all the available business

- barometers designed to forecast similar conditions. (3 cred.; prereq., 4 or 6-7; jr., sr., grad.; MTWThFS II; 102B.) A. W. Marget.
- 161su. Labor Problems. A discussion of employment; hours; wages; extent and strongholds of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. Required course in commercial education sequence. (3 cred.; prereq., 4 or 6-7; jr., sr., grad.; MTWThFS V; 102B.) W. H. Stead.
- 167su. Personnel Administration. A general survey course covering the organization of personnel work and discussing briefly the types of problems confronting the typical personnel department. Principles applicable to educational institutions, commercial and industrial establishments. (3 cred.; prereq., 161; jr., sr., grad.; MTWThFS IV; 6B.) W. H. Stead.
- 190su. Public Finance. Government revenues, expenditures and debts, including a study of the principles and various forms of taxation, budgetary legislation and control, war and emergency financing, the shifting and incidence of taxes and fiscal reforms. (3 cred.; jr., sr., grad.; prereq., 4 or 6-7; MTWThFS III and one hr. ar.; 202B.) W. R. Myers.

## SECOND TERM

- 7su. Principles of Economics. A continuation of Course 6su. (3 cred.; prereq., 6; soph., jr., sr.; MTWThFS I; 202B.) J. J. Reighard.
- 26su. Principles of Accounting. Applications of interest to accounting problems, bonds, sinking funds, principles of valuation, valuation of particular assets, depreciation methods, statement preparation and analysis, different applications of accounting. (3 cred.; soph., jr., sr.; prereq., 25; MTWThFS II; 302B.) J. J. Reighard.
- 102su. Advanced General Economics. A continuation of Course 101su. Rent, wages, and profits. For the Summer Session this course is the equivalent of Course 104. (3 cred.; prereq., 101 or 103; jr., sr., grad.; MTWThFS II; 202B.) B. D. Mudgett.
- 112su. Business Statistics. Survey and criticism of methods used in analyzing time series, with special applications to the study of cyclical fluctuations of economic phenomena. (3 cred.; jr., sr., grad.; prereq., 14; MTWThFS IV; 102B.) B. D. Mudgett.
- 146su. Investments. Bonds, mortgages, endowments, annuities, stocks, and other forms of property in which funds may be invested or risked, with particular emphasis on the needs of the conservative investor. The criteria of a good investment are carefully considered and tested by applying them to specific issues of governments, corporations, and individuals, including railroads, industrial, timber, and mining securities, and real estate loans. (3 cred.; prereq., 4 or 6-7; jr., sr., grad.; MTWThFS III; 202B.) J. W. Stehman.
- 155su. Corporation Finance. The organizing, financing, and managing of corporations. A study of corporate securities for purposes of promotion and reorganization and of facilities for marketing them. For the Summer Session this course is equivalent to Econ. 160. (3 cred.; prereq., 4 or 6-7; jr., sr., grad.; MTWThFS I; 102B.) J. W. Stehman.

## THE INSTITUTE OF CHILD WELFARE

The Institute of Child Welfare was organized in July, 1925, for the purposes of: studying the development of the young child from as many aspects as possible, training of future workers in the field of child welfare, and bringing to the people of the state through its teaching and extension services the information accumulated in its own and other research centers. Co-operating with the institute in its research and extension 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. As part of its program, the institute maintains a nursery school for children between two and five years of age and a kindergarten for five-year-olds which will be in operation during the first term of the summer quarter, and which, under certain limitations, will be open for observation by appointment. Because of the interest in this field, the institute is offering a full program of courses during the first term for those seeking either undergraduate or graduate credit. The courses which follow are accepted for credit in the College of Science, Literature, and the Arts, the College of Education, and the College of Agriculture, Forestry, and Home Economics, and in the Graduate School when so indicated.

### FIRST TERM

- C.W. 40su. Child Training. A study of the physical and mental development of the child followed by a discussion of the problems of the home training of young children. Observations in the Nursery School, lectures, and reports. (3 cred.; jr., sr.; prereq., Psy. 1-2; MTWTh I and two hrs. observation as ar.; 202OLa.) Marion L. Faegre.
- C.W. 80su. Child Psychology. A survey of child development with special reference to nursery school and kindergarten education. (3 cred.; jr., sr.; prereq., Psy. 1-2; MTWThFS IV; 202OLa.) Florence L. Goodenough.
- C.W. 120su. Health Care of the Young Child. A course in the physical care, illnesses, prevention of disease, and health problems of the young child. Primarily for those who have charge of groups of children, and for workers in parental education. With the co-operation of the Department of Pediatrics. (2 cred.; sr., grad.; open to graduate students and to seniors in the curriculum in nursery school education; MTWTh VI; 202OLa.) Edith Boyd.
- C.W. 130su. The Development of the Young Child. An advanced course dealing with the development of the pre-school child from the anatomical, physiological, psychological, educational, and social aspects. Lectures, readings in the experimental literature, and reports. (3 cred.; sr., grad.; prereq., 12 cred. in child welfare or psychology or equivalent, and permission of instructor; MTWThFS II; 202OLa.) J. E. Anderson.

- C.W. 170su. Parental Education in Child Care and Training. A consideration of the content and methods used in courses and study groups for parents in the care and training of young children. Lectures, discussions, and reports. (3 cred.; sr., grad.; prereq., 8 cred in C.W., or H.E. 34, 35, and 44, or 15 cred. in education, or psychology, or sociology, or preventive medicine; MTWThFS III; 202OLa.) Marion L. Faegre.
- C.W. 233su. Research in the Development of the Young Child. (Cred. ar.; grad. students only; hrs. ar.) J. E. Anderson, Josephine C. Foster, Florence L. Goodenough.

The following courses listed under Theory and Practice of Teaching are offered by the institute:

- Ed.T. 30su. Principles of Kindergarten and Nursery School Education. The development, aims, and organization of kindergarten and nursery school education. A consideration of the curriculum and methods to be employed. (3 cred.; jr., sr.; prereq., C.W. 80; MTWTh VII, F VI-VII; 202OLa.) Josephine C. Foster.
- Ed.T. 31su. Permanent Play Materials. A consideration of the various kinds and types of permanent play materials (blocks, dolls, trains, wagons, etc.) and their use by children of different ages. (2 cred.; jr., sr.; prereq., Psy 1-2; MTWTh VIII; 202OLa.) Josephine C. Foster.
- Ed.T. 34su. Story Telling for Young Children. A study of folk, fairy, here-and-now stories and poetry suitable for young children. The principles underlying story telling, the selection of the story, and versions. The educational importance of conversation with the child. (2 cred.; jr., sr.; prereq., Ed.T. 30; MTWTh VI; 202OLa.) Keith E. Headley.

#### SECOND TERM

- C.W. 40su. Child Training. A study of the physical and mental development of the child followed by a discussion of the problems of the home training of young children. Lectures, recitation and reports. (3 cred.; jr., sr.; prereq., Psy. 1-2; MTWThFS III; 202OLa.) Esther McGinnis.
- C.W. 60su. Modern Aspects of Child Study. A survey of the background and present scope of modern child study in its various aspects, such as nursery schools and parental education, child health and mental hygiene, the kindergarten and Montessori movements and the development of research organizations. (2 cred.; jr., sr.; prereq., 6 cred. in psychology and 5 cred. in social sciences; MTWTh IV; 202OLa.) Esther McGinnis.

Special attention is called to two courses in Anatomy, 133su and 136su, offered by Mr. Scammon and described on page 80 of this bulletin. These courses, which are open to graduate students in the Institute of Child Welfare, offer an excellent opportunity for those interested in the physical development and growth of the child.

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